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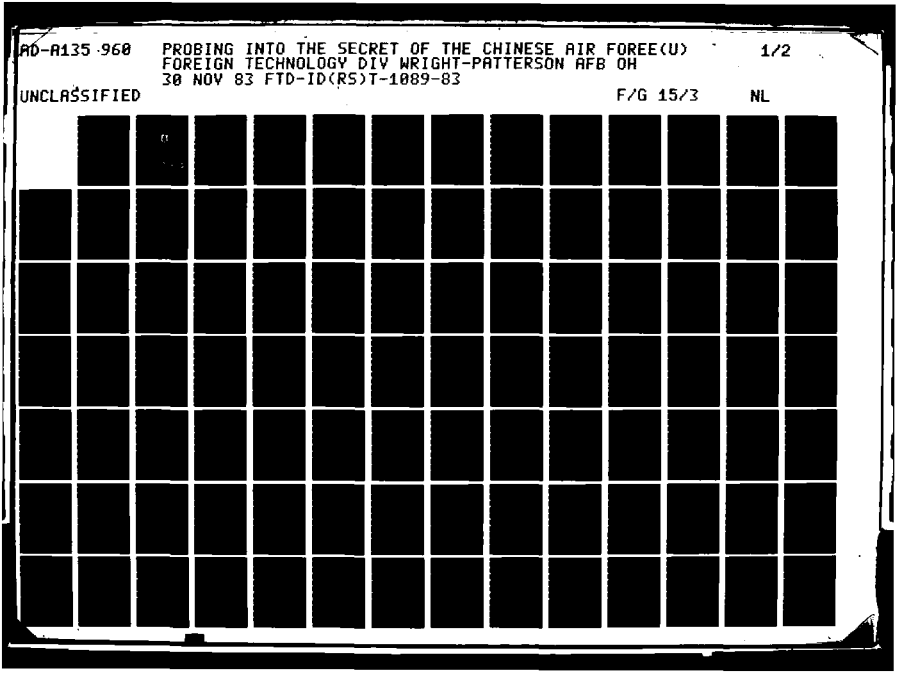

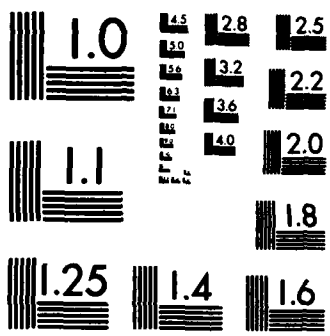

FTD-ID(RS)T-1089-83

FOREIGN TECHNOLOGY DIVISION

PROBING INTO THE SECRET OF THE CHINESE AIRFORCE

Approved for public release;
distribution unlimited

EDITED TRANSLATION

FTD-ID(RS)T-1089-83 30 November 1983

MICROFICHE NR: FTD-83-C-001469

PROBING INTO THE SECRET OF THE CHINESE AIRFORCE

English pages: 111

Source: Enclosure to IR 6 842 0088 83-Booklet
Entitled "Inside the Plaaf", pp. 1-44

Country of origin: China
Translated by: SCITRAN
F33657-81-D-0263
Requester: FTD/TQTM

PREPARED BY:

TRANSLATION DIVISION
FOREIGN TECHNOLOGY DIVISION
WP-AFB, OHIO.

GRAPHICS DISCLAIMER

All figures, graphics, tables, equations, etc. merged into this translation were extracted from the best quality copy available.

PROBING INTO THE SECRETS OF THE CHINESE AIRFORCE

Military Knowledge Series, No. 5

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Publisher: Huafeng Publishing House
184-188 Johnson Road
Wanchai, Hong Kong
Telephone: 5-754999

Editor: Editing Team of the Military Affairs Series
Mailing Address: P.O. Box 23063
Wanchai, Hong Kong

Distributor: Li Yuan Shu Bao She
18-16 Youmadibenlan Street
First floor, Room A, Kowloon
Telephone: 3-844483
Distribution Department of Huafeng Publishing House telephone number: 5-757709

Printer: Guangyi Printing Company
657-659 Beijiaoyinghuang Road, Hong Kong
Dongxiang Factory, Room D., Fourth floor

Price is 5 Hong Kong dollars per volume.

CHINA'S MILITARY AIRCRAFT INDUSTRY

Reference Room

China's aircraft industry is a new and developing industry which began to develop after 1949. After thirty years of building, it has initially formed a comparatively perfect and complete aircraft industry system with scientific research, production and education etc. which can mass produce fighters, attack planes, bombers, helipcopters, transports, training aircraft etc., strengthen national defense and promote its greatest effects in building the national economy.

At the beginning of the 1950's during the Korean War, the staff and workers of the aircraft industry both constructed and produced as well as went all out to rush repairs on aircraft and engines under the poor conditions of a small number of repair plants left over from before 1949 in order to support the needs of the fighting at the front. In 1954, new China's first aircraft was successfully trial-manufactured. In 1956, a Chinese made jet aircraft went up. During the 1960's, China was already able to design and mass produce supersonic fighters and other products by itself. Afterwards, during the Cultural Revolution, the aircraft industry was seriously disturbed and destroyed by political turmoil so that the gap between China and the advanced world level, which had been shrinking, was again enlarged.

After the "gang of four" fell from power, the aircraft industry was once again given serious attention and there was a noticeable raise in product quality. China's self-made high altitude, high speed fighters, large transports and other types of aircraft urgently needed by the units realized finalization in design and there was also a large scale growth in products for civilian use.

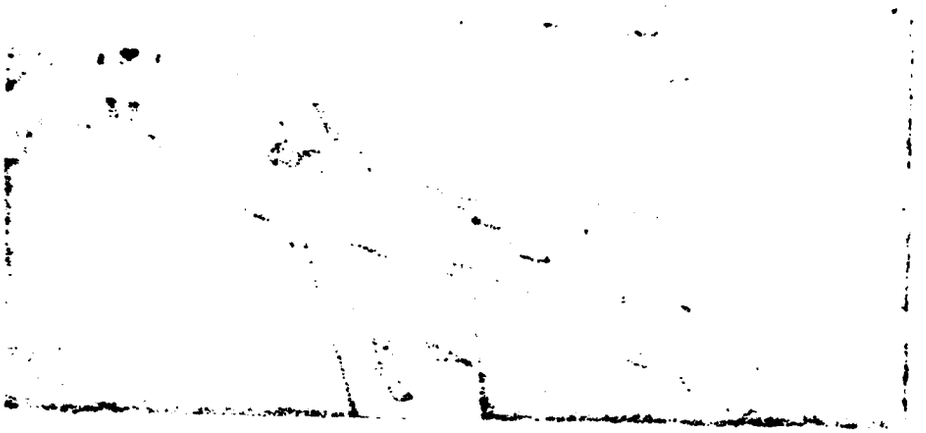

Fig. 1 Newly built Qiang-5 attack aircraft.

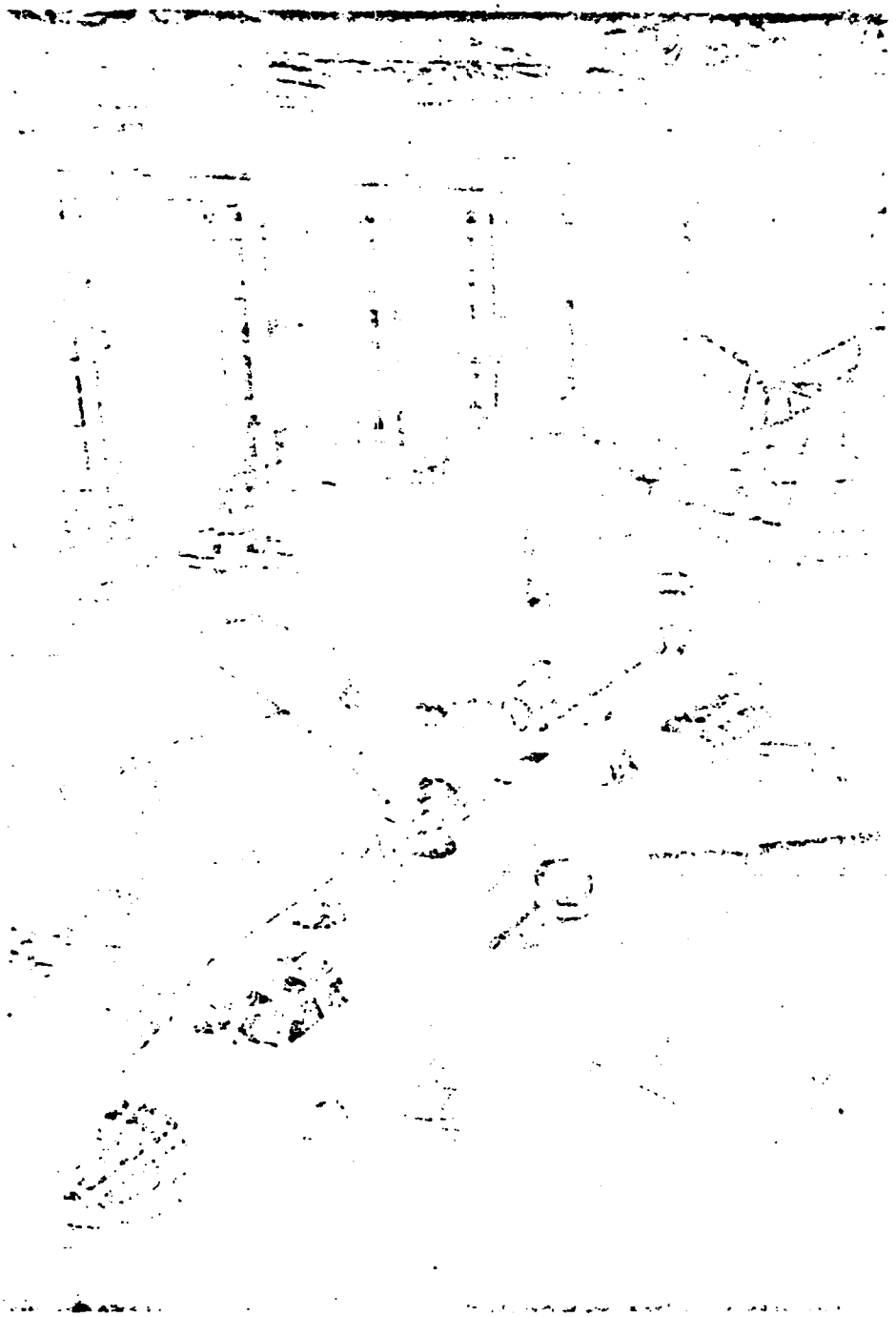

Fig. 2 Assembly line of the Hong-6 medium bomber.

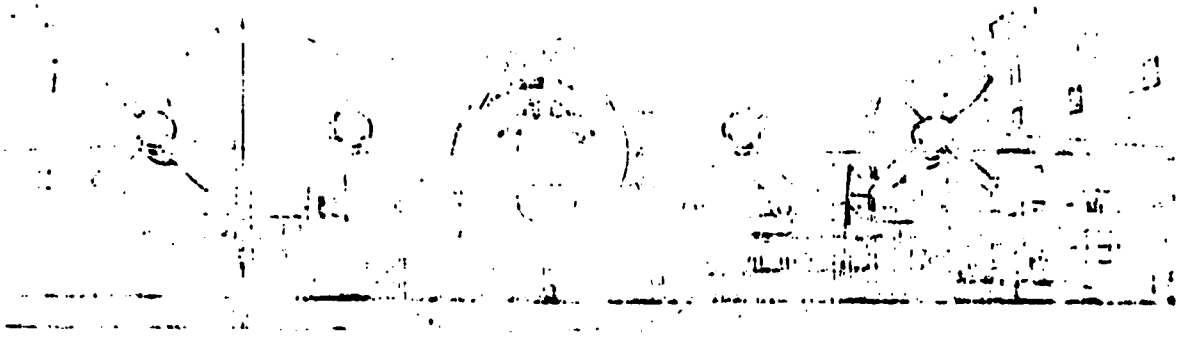

Fig. 3 Assembly line of the Yun-8 medium transport. The Yun-8 is a Chinese copy of the Soviet designed An-12 Cub which is in the same category as the American C-130 Hercules.

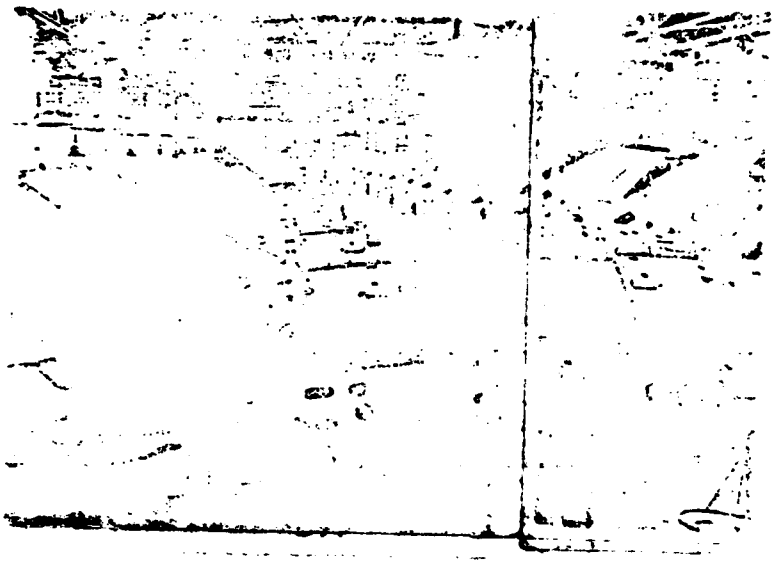

Fig. 4 Rear sections of the Qiang-5 aircraft seen in the assembly hangar.

Fig. 5 Wopen 6A turbojet engines being installed in Qiang-5 aircraft.

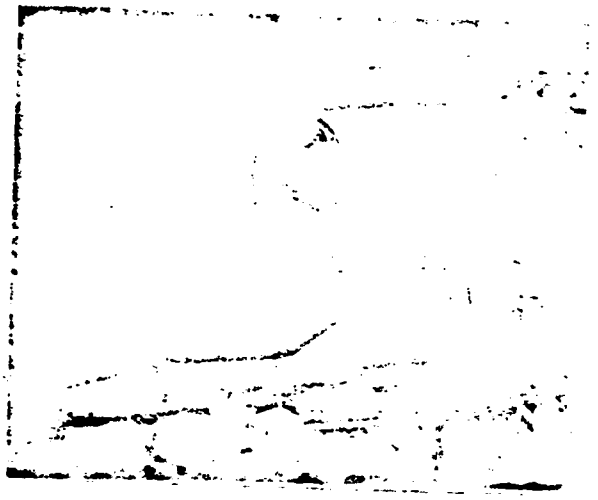

Fig. 6 Jian-7 fighters.

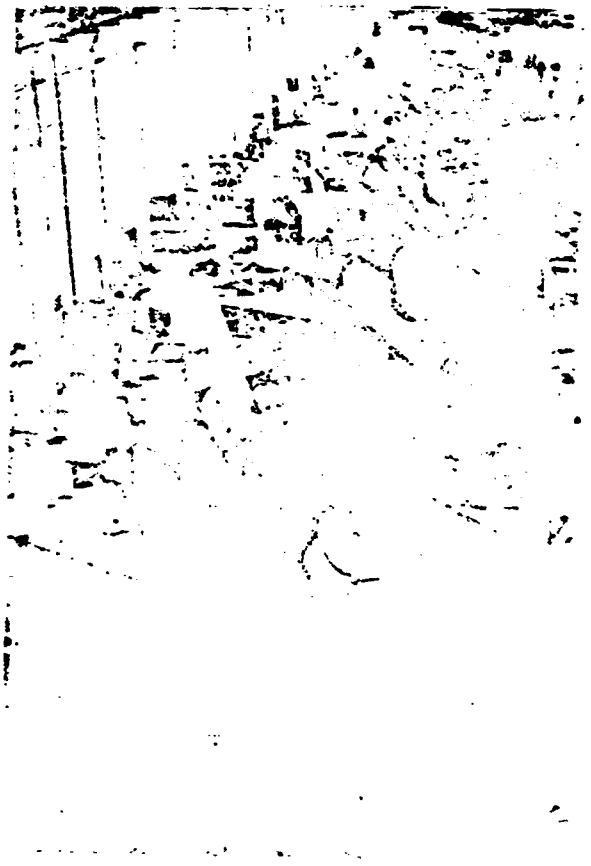

Fig. 7 Assembly line of the Jian-7 fighter.

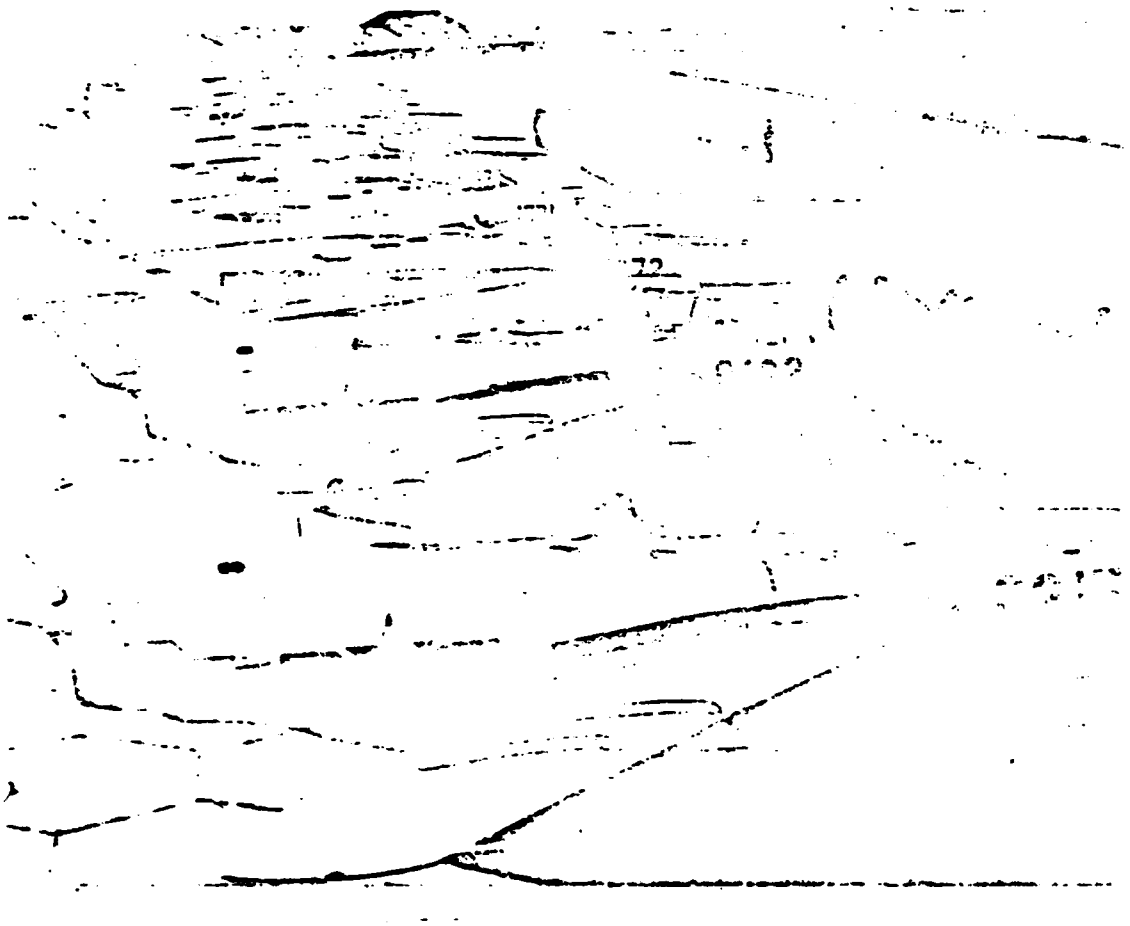

Fig. 8 The Chinese built MiG-17 twin seater training aircraft.

Fig. 9 PLA airmen scrambling to their Jian-6 fighters in routine exercise.

The Chinese Air Force - The Giant Which is Unable to Catch Up With The Times

During the Sino-Soviet honeymoon period following the Communist take-over in China, the Chinese aeronautics industry was set up with massive Soviet assistance. The major centres were in Harbin and Shenyang. They started as assembly and maintenance centres for the Soviet supplied MiG-15s which were then deployed to the Korean frontlines. Subsequently, with Soviet production agreements and spectacular Chinese efforts, China started producing MiG-17s, IL-28s and VK-1 turbojet engines.

By the late 1950s, the Chinese obtained license production rights to manufacture MiG-19s and the associated RD-98 turbojet engines and, in spite of Soviet doubts and disapproval, started working on a Tu-16 bomber production line. However, before any of these ambitious plans came to fruition, the Chinese broke up with their Soviet mentor. As a result, the Tu-16 line had to be shelved and all efforts were diverted to the MiG-19 SF (Jian-6), which reached a more advanced stage of development. Follow-on developments included the copying of the Soviet MiG-21F, this time without the Soviet assistance, and the negotiation with several Western nations for the purchase of more advanced fighter planes including the Swedish Draken, French Mirage III and Swiss P-16. However, none of these came to anything. Sweden and others declined the sale and the Chinese copy of the MiG-21F (Jian-7) proved to be under-powered and production ceased after the roll-out of less than a hundred units later

proved to be below standard. So by the end of the 1970s, the Chinese Air Force still had to rely on the by then obsolete Jian-6. Despite the fact that the Chinese has developed many variants of Jian-6, such as the Qiang-5 ground support aircraft, the PLAAF is still sorely in need of modern replacements.

With the purchase of the British Spey turbofan engine and its production rights, the Chinese will be able to up-grade their airforce to a certain extent. The fleet, however, will still lag behind in the all important field of avionics for the foreseeable future unless western assistance could be obtained. The effectiveness of the speculated F-10 and F-12 is still much open to doubts and so is the actual ability of the stated Chinese aim of technical parity with the western industrial nations in the aeronautic field by the turn of the century.

"Farmers, Farmers" was the call heard on the radio of two Grumman A-6 Intruder aircraft of the U.S. Constellation aircraft carrier cruising in the Bay of Tokyo. Then communications were cut off. After only several hours, the Chinese made an official announcement: after two American aircraft invaded Chinese air space, they were shot down over Guangxi by fighters of the PLA air force.

The date of this incident was August 21, 1967. At this time, the Chinese built MiG-19 aircraft (called Farmer by Western nations) had already been in service for five years. It active service had greatly raised China's air defense capabilities and it had gradually developed into a major fighter of the world's third largest airforce. A large number of MiG-19 fighters emerged in the Chinese airforce causing Western nations to revise their estimations of China's potential to make fighters. If the Western fighters had not changed to use advanced technology in the middle of the 1960's, then, to date, the MiG-19 would still be an effective combat aircraft.

Between 1965 and 1966, China aided Pakistan by giving them 90 of these aircraft. The pilots of the Pakistan Air Force praised this aircraft as being solid, easy to operate and said that its performance was superior to the French built Mirage IIIE and the American built F-104A Starfighter aircraft. They also said that its turning performance at any altitude and its climbing performance below 6,100 meters was not inferior to

that of the MiG-21 Fishbed righter.

It is already fifteen years since the two A-6 aircraft were shot down and during that period there has been considerable progress in the world in combat aircraft technology. However, looking back on the production of the MiG-19 which began twenty years ago in the Shenyang aircraft manufacturing plants, at present this obsolete fighter is still being produced. Moreover, at present, this fighter is still the only aircraft used in great quantity by the Chinese Air Force which has supersonic speed performance. This shows that China has no way of avoiding the huge air force of the PLA continuing to lag behind. This result is due to the existing ideological split between China and the Soviet Union, the two communist superpowers. When this split occurred at the beginning of the 1960's, it caused the two nations to sever relations and China was unable to bring in Western technical assistance to fill the gap created by the Soviet Union.

Concerted Efforts to Build the Industry

It goes without saying that if a nation does not have a strong industrial foundation, then it is impossible for it to maintain modernization by itself for a long time. The PRC originally had this strong initial foundation, yet the machinery and manufacturing technology used to supply the industry with this initial foundation was already lagging behind a quarter of a century ago. Its production limitations are very serious and there is a lack of widespread research and development capabilities required for the innovation of modern weapon systems. The present backward state of the Chinese Air Force clearly reflects this fact. Now, it has become aware of the fact that it has no way of realizing continued development plans and has no means to supply follow-up new aircraft to replace its former combat aircraft.

During the 1950's, with the aid of the Soviet Union, the Chinese built and developed their own aircraft manufacturing industry. After its split with the Soviet Union, most of the aircraft manufacturing factories were disengaged from the advancement of modern technology and China continued to use the

traditional labor intensive manufacturing methods abandoned earlier by other nations. The Chinese lacked design experience and their development capabilities and level were still very low. Even though the political relations between China and Western nations were not close, the Chinese still actively sought to import aircraft technology from Western aircraft companies so as to reorganize their aircraft manufacturing factories and provide them with the ability to produce new advanced aircraft. However, after long negotiations, they only obtained certain contractual proposals. The Chinese did not abandon their tradition of speaking in circuitous and roundabout ways, their talent for friendly but evasive mannerisms and their not caring if the time for agreements elapsed. In this way, it is very difficult to predict that they will be able to attain their stated goals in the latter half of the 1980's: to raise the technical level of the aircraft manufacturing industry which will allow them to reach the standards of the major Western industrial nations.

Today, China's aircraft manufacturing industry is developing on the industrial foundation established by Japan in China's northeast during the 1930's. At that time, Japan had already set up advanced aircraft and engine manufacturing factories there. However, during the period of the Soviet occupation, all of the factories and equipment in the northeast were dismantled and transported to the Soviet Union. In 1949, when the Chinese Communists took complete control and the Russians left the three provinces of northeast China, the Chinese government received massive Soviet assistance. For the next ten years, there were close relations between China and the Soviet Union. The Soviet government discovered that it must newly build, equip and manage the factories which had been removed several years earlier. The most important industrial centers in China's northeast were Shenyang and Harbin. Later, they became the major centers of China's aero-engine manufacturing industry. The aircraft and aero-engine manufacturing factories are administered by the Third Ministry of Machine Building of the State Council.

Fig. 10 After World War II, the Chinese Communists in northeast China took over some of the Japanese military aircraft and began setting up aviation training schools. During the Korean War, many volunteer pilots flying MiG aircraft and fighting American military aircraft received training at these schools.

In October, 1950, the Chief of the General Staff of the Soviet Armed Forces, Marshal Vasilevsky, sent Marshal of Aviation Krasovsky to Peking to accelerate the plans for training and an extensive new Chinese Air Force. He told Chairman Mao Zedong that very soon several hundred of the newest MiG-15 fighters would be sent to China. In order for these fighters to have important effects in the air combat on the Korean battlefield and to provide emergency assembly and overhaul equipment, the work of rebuilding the Shenyang aircraft manufacturing factories was listed as a task of top priority but the work of actively

preparing the actual manufacture of aircraft chassis and aero-engines could not but have certain controls.

In November 1952, China and the Soviet Union signed a licensed agreement in Moscow that Shenyang would produce Yak-18A primary class training aircraft and Ivchenko AI-24R 260 horse-power nine-cylinder air cooled engines. From this, China actually restored its manufacture of aircraft. The first Yak-18A manufactured in China began to be flown in July, 1954 and the Chinese number was Chujiao-5. After this, production continued with engines continually supplied by the Soviet Union. Two years later, Shenyang began to supply their own manufactured engines (Note 1).

In October, 1954, China and the Soviet Union signed a licensed production agreement with a much wider range than before. The aim was to allow China to be self-sufficient in production but the plan was not exactly that. This agreement not only included the Antonov An-2 multipurpose biplane transport, the Mi-4 helicopter and the Svetsov ASh-62 and ASh-82 engines used by them but it also included the MiG-15 UTI twin seater high level fighter training aircraft, the MiG-17F single seater fighter and the Ilyushin IL-28 light bomber as well as the Klimov VK-1 turbojet engine used by them.

This plan caused the combined enterprises of the Shenyang and Harbin factories to greatly expand. China also constructed new factories in Xian, Chongqing and other locations and at the same time imported a large number of Soviet management, technical and training personnel. The production of the MiG aircraft and Klimov engines was concentrated in Shenyang. Harbin was mainly responsible for producing IL-28 aircraft. Because of the urgent need to enlarge and modernize the PLA Air Force, the production of these aircraft were given special attention and high priority. The first MiG-17 aircraft with parts and packages supplied by the Soviet Union was presented at a handing-over ceremony in 1956. Seven weeks later, another assembly line of a Shenyang aircraft factory delivered the first MiG-15UTI aircraft. Each year up until 1957, the Soviet joint production of these two types of Mikoyan designed aircraft had reached fifteen aircraft

per month and in 1957 production had reached twenty-five per month. At this time, the engine chasses were already being completely made in China. Shenyang also began to produce VK-1 turbojet engines. Among the clear weather MiG-17's produced was the MiG-19PF aircraft which had limited all weather performance.

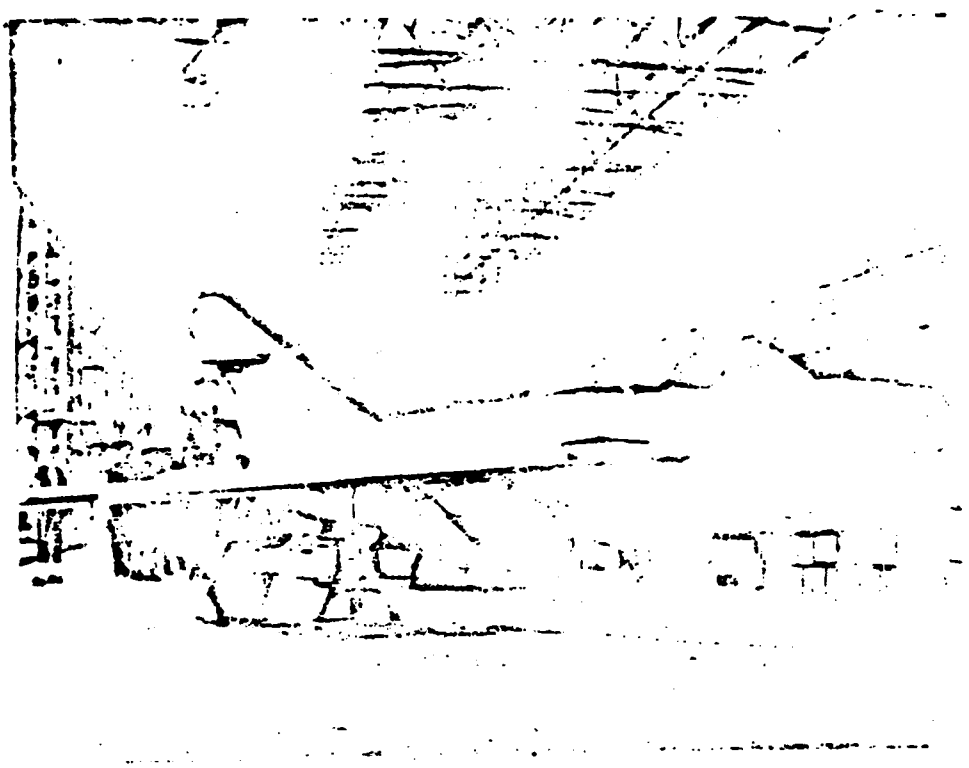

Fig. 11 The Mi G-17F fighter made by the Shenyang Aircraft Manufacturing Factory during the 1950's. The Chinese number is Jian-5. The picture was taken during checks of the Jian-5 before leaving the factory.

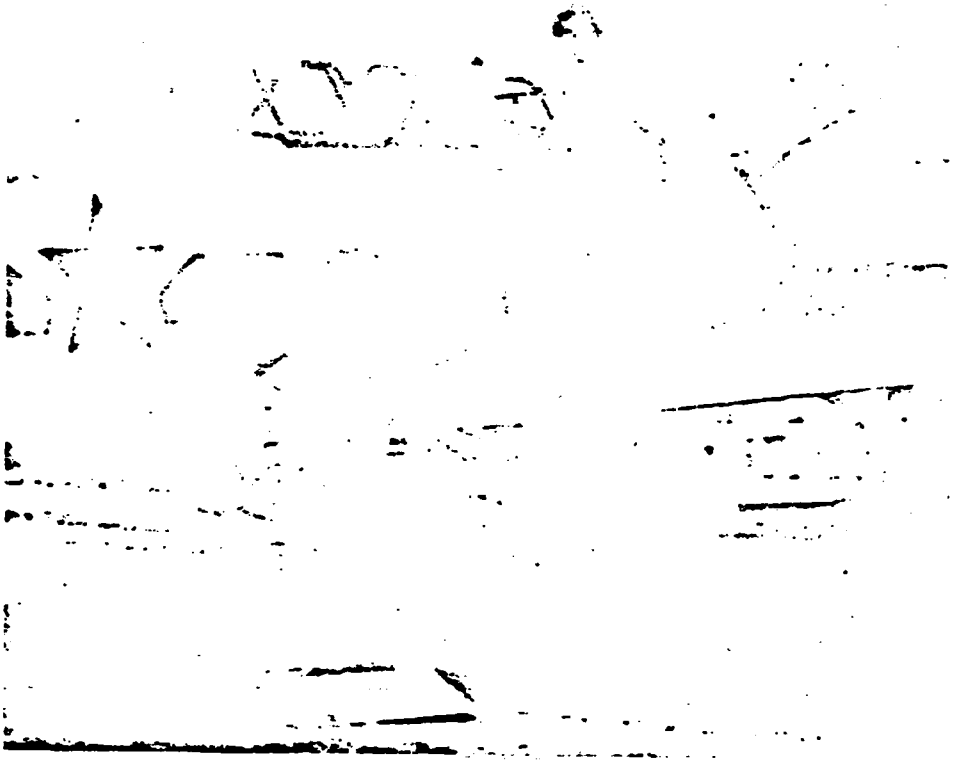

Fig. 12 China's first self-made aircraft: called Chujiao-5 in China, it is a copy of the Soviet Yak-18A. In the picture, two female aviation students are gesturing at a model of the Hong-6(Tu-16) aircraft.

Naturally, China uses it own model numbers to name these aircraft built under a licensing agreement: the MiG-17 is called the Jian-5 and the IL-28 is called the Hong-5.

The first aircraft which used the parts of the An-2 aircraft supplied by the Soviet Union began flights in December, 1957. China organized large scale production with the assistance of many widely spread out parts assembly factories and this aircraft called the Yun-5 can be used for civil as well as military use. The first Mi-4 helicopter was completed at the beginning of 1958 and it was named the Zhi-5 helicopter. This aircraft was also produced on a large scale and it can be used for civil as well as military use. The variant used in civil aviation is called the Xuanfeng.

By the end of the 1950's, under license, China's aircraft

industry produced a very wide range of aircraft. The types of aircraft included strategic fighters, light bombers, multi-purpose transports and helicopters, yet the aspiration of the Chinese did not stop here. The Air Force of the PLA had already set up a limited strategic air force unit which had a small number of heavy bombers with Tupolev Tu-4 piston engines. This type of aircraft was imported from the Soviet Union after the Long Range Air Force of the Soviet Union replaced it with a heavy bomber (such as the Tu-16) with a turbojet engine. It is said that China used the turboprop engine to refit this type of aircraft.

Even though the Soviet Union expressed opposition saying that the production of this type of large and complex aircraft exceeded the abilities of the Chinese, in 1958 China began to prepare to use a new specially equipped Tu-16 aircraft chassis. Aside from this, in January, 1958, China signed another licensing agreement with the Soviet Union to manufacture the supersonic MiG-19 aircraft after the MiG-17 and the Tumsky RD-9B turbojet engine used by it.

In the same year, the Hongdu Machine Factory in Nanchang, China began to develop a new basic training aircraft. They used the self produced 285 horsepower "Piston 6"engine for power. This type of aircraft which was called the Chujiao-6 was similar to the Yak-18A and was put into service in 1961.

Starting From Scratch After the Sino-Soviet Split

The ideological split between China and the Soviet Union began to surface in 1959 and this split resulted in the Soviet Union cutting off military assistance and material supplies to China. Because the Chinese continued to be uncompromising under this pressure, Sino-Soviet relations were finally completely broken off. The result of this was of serious injury to China's scientific and technological industries. The Soviet Union immediately recalled 1,390 Soviet specialists working in China and this had very serious effects on China's aircraft industry. The Soviet Union moved out the articles in each office of the

administrative departments in China's national aircraft factories and even moved out the blueprints and technical drawings. At this time, the assembly line of the MiG-19 was still not completed nor was the RD-9B engine used for this type of fighter so that the Tu-16 aircraft major assembly halls were not finished and many assembly benches and machine tools were still in the Soviet Union.

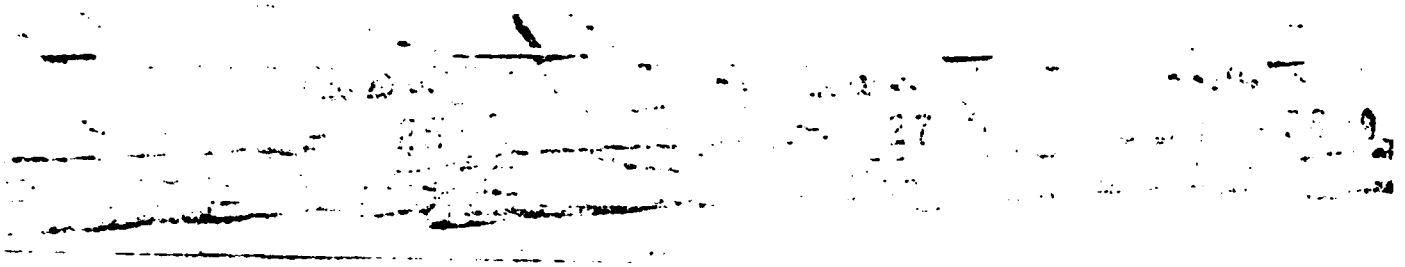

Fig. 13 Early Chinese Air Force aircraft: the Soviet made MiG-15 single seater fighter and the MiG-15UTI twin seater training aircraft. The latter was made on Chinese soil.

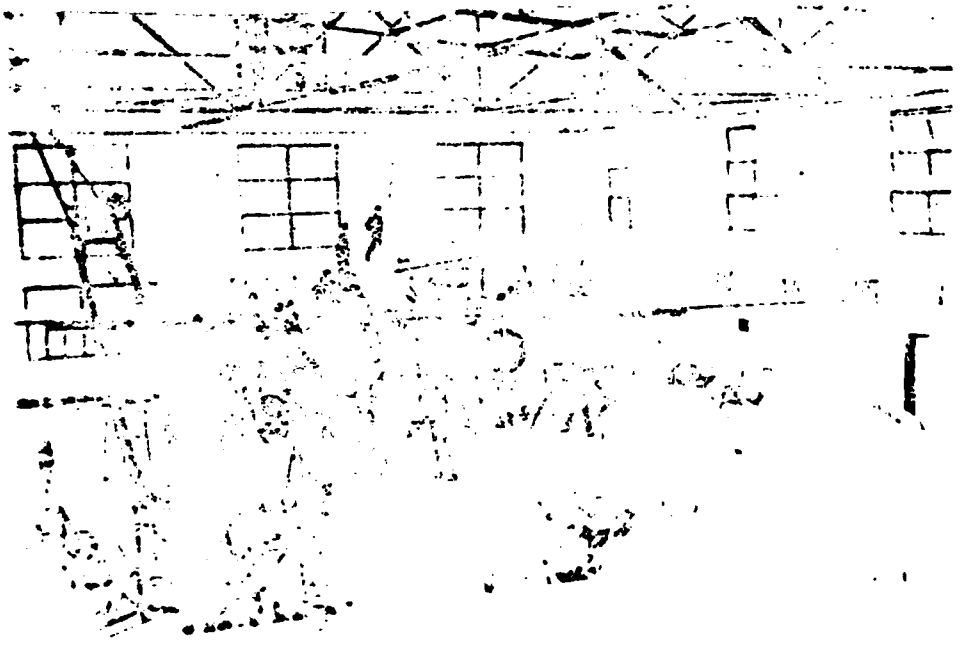

Fig. 14 One corner of a repair shop of China's Air Force. In the picture, we can see two Hong-5 light bombers being overhauled.

Even though this be the case, when the design of the bomber was temporarily put aside, the design of the MiG-19 was still given the highest priority. Although the Soviet specialists left, the Chinese personnel lacked experience and did not have complete training, many parts of the fighter were disassembled and continued to be transported from the Soviet Union to Shenyang (Note 2). This first assembled MiG-19 aircraft began flight tests at the end of 1961. At the same time, China began to duplicate formerly complete equipment supplied by the Soviet Union (such as ejection seats, armed aiming devices, hydraulic systems, control devices and certain instruments etc.). This involved many unfamiliar technical processes, and new production techniques and materials. In 1962, the first new MiG-195 fighter was delivered to the aviation troops of the PLA for use and it was called the Jian-6. Although these fighters still used Soviet parts, equipment and engines, yet in 1964 they still produced one hundred Jian-6 aircraft. This shows that China's aircraft industry was really extraordinary and although it lacked technical experience, it overcame the many major difficulties caused by the cut-off of Soviet assistance.

At the same time, large scale production of the Lian-5 (An-2) transport, Zhi-5 (Mi-4) helicopter and Hong-5 (IL-28) bomber still continued; the Jian-5 (MiG-17F) fighter was changed into a high class training aircraft and put into mass production. The self-made Chujiao-6 teaching aircraft and the Piston-6 engine used by it have already entered the stage of high speed development. A great deal of effort has already been expended in the technical and development department although this department is still the weakest section in this industry.

Among these, the most interesting are the plans for the follow-up of the Jian-6 which began to be produced at the end of the 1960's and the three different methods which were used to realize this goal although the later methods were all unsuccessful. The simplest method was the purchase of Western technology, the obtaining of licensed production privileges from a nation which was non-antagonistic towards China so as to manufacture

high class combat aircraft. In 1962, China carried out talks with Sweden to import Shenbao 35 "Long" (Draken) aircraft technology; afterwards, they also showed interest in Switzerland's FFA P-16; in 1964, after France recognized the PRC, China then carried out discussions on the purchase of "Mirage III" aircraft technology but ideological problems and long term lack of diplomatic relations obstructed them so that later none of these proposals came to fruition.

At the same time, China's aircraft manufacturing industry continued to work hard hoping to use two other methods of self-reliance. At the beginning of the 1970's, the air force troops of the PLA were supplied with more advanced fighters and these two methods showed the lofty aspirations and great ideals of the Chinese. One of the methods was starting from scratch, copying the MiG-21 and manufacturing it themselves. The other method was the production of a completely self-designed new model aircraft. At the beginning of the Sino-Soviet split, the PRC carried out preliminary negotiations with the Soviet Union hoping to be able to obtain special permission to manufacture the MiG-21F (Fishbed-C). At this time, the MiG-21F was the clear weather air-to-air fighter used by the Soviet Air Force. Before this, a prototype of the MiG-21 had already been transported to China and the highest authorities decided to copy this fighter. The Academy of Military Science received instructions to supervise this arduous task. At that time, China still had many problems it could not resolve in the production of the MiG-19. People generally considered that given China's level, to copy such a high level and complex aircraft exceeded China's technical capabilities. However, beginning from the basic parts, work began in 1960 on copying the MiG-21 aircraft and its Tumansky. R-11 turbojet engine.

At this time, China's aviation industry began to obtain graduating engineering and technical personnel from the Beijing Aviation College (the highest theoretical and practical school for aeronautical engineering in China), Harbin Industrial University, Nanjing Aviation College and Xibei Industrial University.

Under the guidance of the Chinese Academy of Sciences, new institutes were established and much practical research was carried out. In 1959, two high speed wind tunnels were purchased from the Democratic Republic of Germany and installed yet they still lacked technical experience. The tremendous task was given to the young and immature aircraft industry and it frightened people. The work of copying the MiG-21F was finally completed in Shenyang and flights of the completed aircraft began at the end of 1964. The Chinese announced that their "new 2 mach fighter" had already been "built." The flight tests of this aircraft were announced in Beijing on January 8, 1965 by Liu Yalou at a National Defense Committee conference. At the time, Liu Yalou was the Minister of the Third Ministry of Machine Building and was in charge of building military aircraft. At this conference, developments related to new fighters, jet bombers as well as short range nuclear missiles fired from the ground were reported.

Performance tests on the MiG-21 were carried out during the first three months of 1965. During the tests, 12 to 15 Chinese made MiG-21 were used. Without waiting for definite results from these flight tests, the copied MiG-21 began to be mass produced by the Shenyang Aircraft Manufacturing Factory and it was called the Jian-7 fighter. It seemed that very quickly people discovered that this Jian-7 fighter was not completely successful. Liu notified the National Defense Committee of this situation. In reality, because there was no way of resolving the problems which appeared in the Jian-7, production of this aircraft had to be halted in 1966 after 60 to 80 had been made. They returned to mass producing the Jian-6.

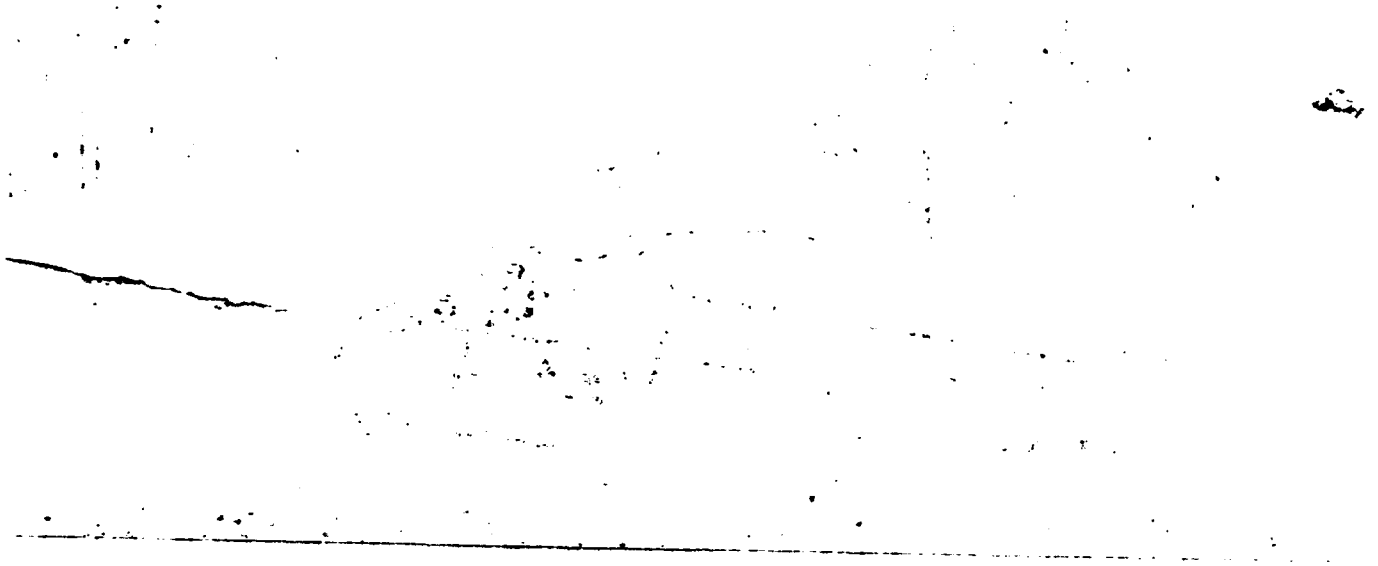

Fig. 15. The Chinese self-made Soviet Mi-4 "Hound" helicopter called the Zhi-5 by the Chinese and the model for civilian use is called the Xuanfeng (Whirlwind).

The designs of the two completely domestically produced fighters, the single engine Jian-8 and the twin engine Jian-9 were naturally a little larger. It was obvious that the engines used for these two types of aircraft copied the Tumansiji R-11 turbojet engine. However, China's aircraft industry encountered difficulties in producing the Tu-16 medium range bomber. This aircraft had been set aside at the beginning of the Sino-Soviet split and after two years production was resumed. At this time, the production of this large and complex aircraft was delayed and as a result production did not really begin until 1968. This aircraft is called the Hong-6 bomber. Afterwards, production of this bomber continued slowly until the beginning of the 1970's when it was finally halted. Altogether one hundred aircraft were delivered to the air force.

At the same time, production of the Jian-6 fighter continued and the production model numbers included different types

equivalent to the MiG-19SF and MiG-19PF and several types developed by China's aeronautics industry, for example the tactical reconnaissance plane. This aircraft has a photographic device directly inserted under the cockpit. Connected two seater combat training aircraft were also made in large numbers. Whether this type of aircraft used the Soviet Union's MiG-19UTI aircraft as its basis or not is unclear. The MiG-19UTI aircraft was produced on a small scale in the Soviet Union.

In the development of the Jian-6 aircraft, the high class aircraft with the greatest modifications was the Qiang-6. This aircraft is equipped with a front cone fitted in the two sides of the air intake to replace the front air intake of the original Soviet design. The Qiang-5 has often been considered as an F-9 but in reality the F-9 (China probably calls it the Jian-9) is another "aircraft." The West considers that this newly designed Chinese aircraft was made to meet the needs of installing modernized firing control radar. This explanation is perhaps correct. The major use of the Qiang-5 aircraft is a ground attack plane. However, the type of radar developed by China for all weather flights has possibly been postponed.

Based on photographs issued by China, there are two different types of Qiang-5 aircraft. As for the airframe of the first type, aside from the front section and air intake, the back section is basically the same as that of the Jian-6; the other type has larger modifications, from the head to the tail it is different from the Jian-6. The Qiang-5 aircraft are also equipped with cameras for reconnaissance.

Combine Indigenous and Foreign Methods, Weed Through the Old and Bring Forth the New

In December, 1975, the Technology Import Company of China and the Rolls Royce Company of Great Britain signed an 80 million British pound contract. The contents included the supply of a small number of "Spey" RB.168-25E afterburner turbofan engines and with British technical assistance the production of this type of engine in a Xian factory started. This importation of

technology was of tremendous benefit to China's aviation industry.

According to general outside estimations, China can very possibly refit the "Spey" engine for its F-9 aircraft. However, according to British observers, beginning in 1977-78, China produced a MiG-21 modified aircraft with better performance than the original Jian-7 (MiG-21F "Fishbed-C") aircraft. Its power is possibly the "Spey" engine.

There is no doubt that China has continuously been putting forth great effort to develop high class fighters with their own designs. According to Western intelligence personnel, China began to develop a new delta winged fighter at the beginning of the 1970's which is called the "Xian-A" in the West. However, after many years of tests, this aircraft is still unable to be put into service. After the importation of the "Spey" engine, China began to develop a new generation of F-10 and F-12 fighters. According to reports, the F-10 is a delta winged fighter and is possibly an improved model of the "Xian-A" yet it does not use the "Spey" engine. The F-12 uses the Soviet MiG-23 "Flogger" as its chief source yet it is a completely new design. This aircraft has two "Spey" engines, uses a back-swept wing design but it is not the technically complex variable geometrically shaped back-swept wing. By inference, these two aircraft will be put into service in the middle of the 1980's and will replace the presently lagging behind Jian-5 and Jian-6.

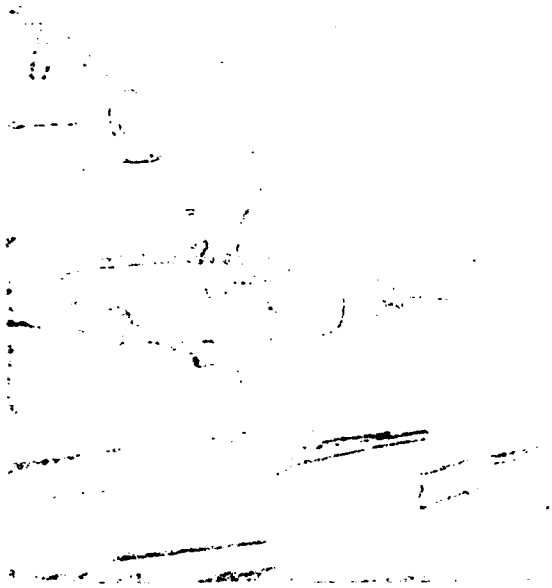

Fig. 16. Night training at a PLA airbase. Taxing on the runway are the Soviet MiG-19PP all weather fighters produced by China. Also seen in the picture are the Jian-6 fighters which is an improvement of the Soviet designed MiG-19SF.

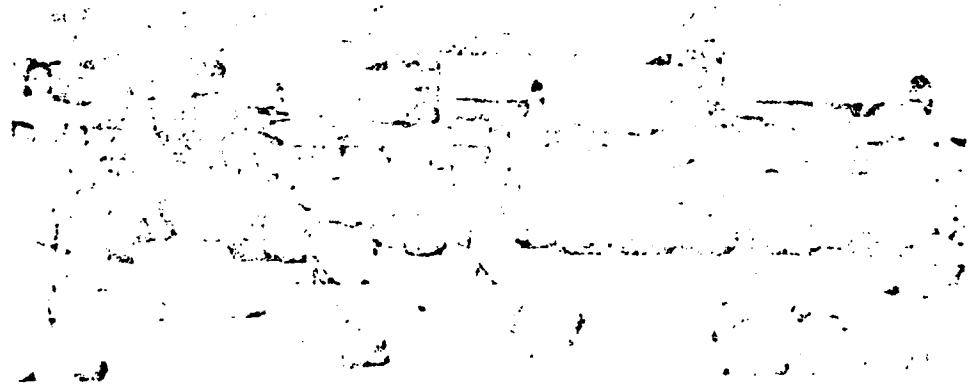

Fig. 17. The Jian-7, a China copy of the Soviet MiG-21F, is a standard daytime fighter equipped with a pair of AA-2 air-to-air missiles (photo by Xinhua News Agency).

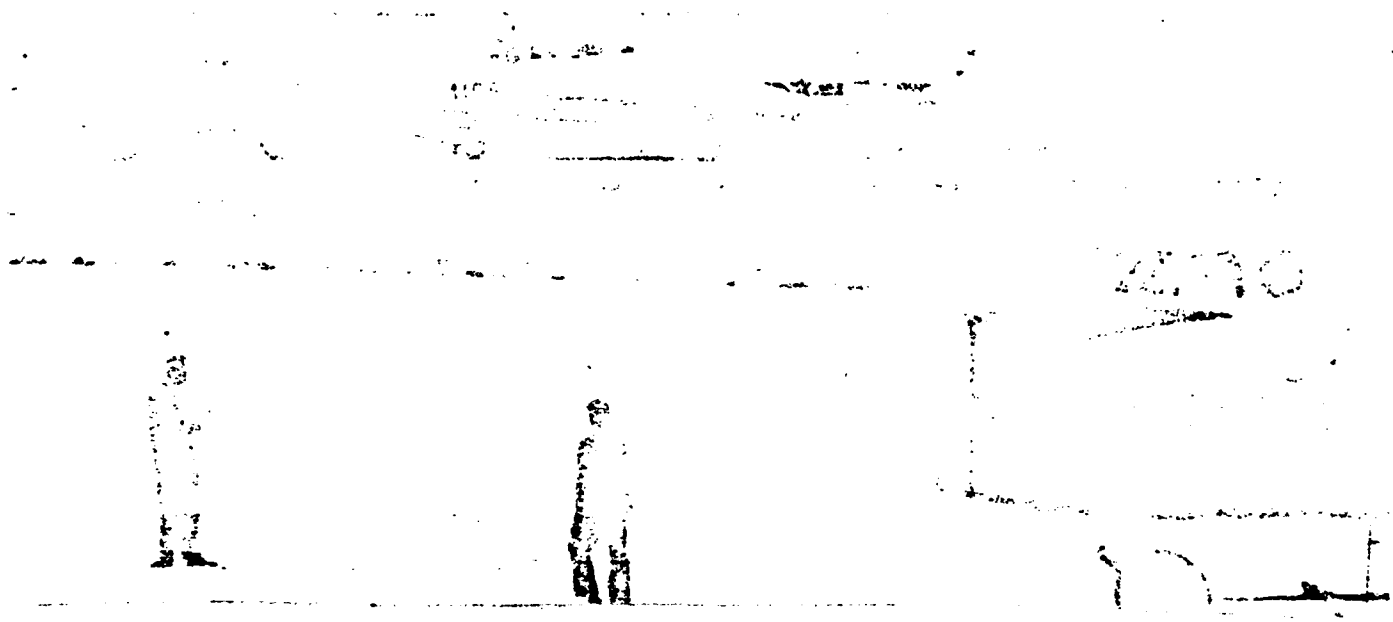

Fig. 18 A twin seater Jian-6 (Farmer-F) training aircraft seen being towed by a truck on an airstrip in Kunming.

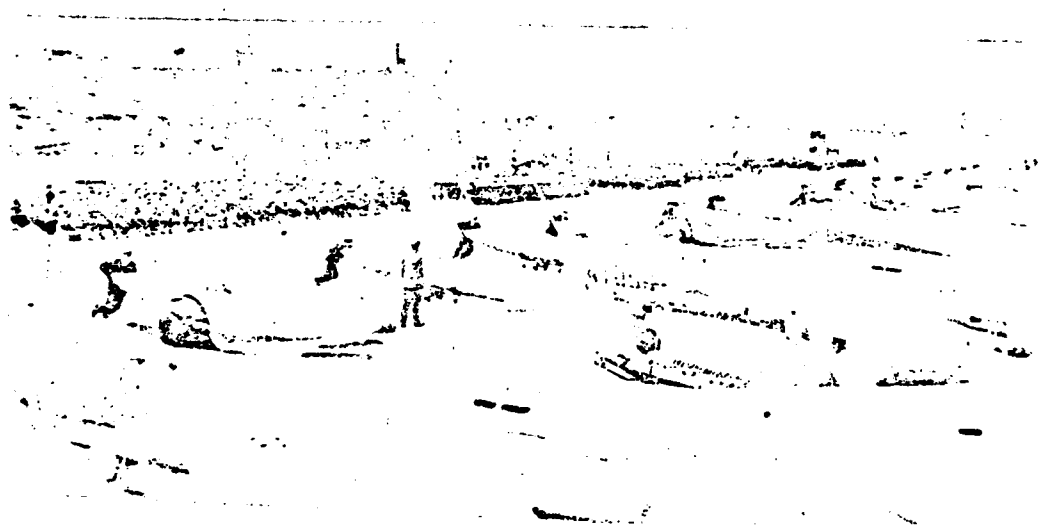

Fig. 19 During checks in 1978 by the Chinese Air Force, 16 people simultaneously installing fuel tanks in 7 aircraft. The ground crew uses a newly made easy to handle trailer. Installation of one fuel tank requires only one person over one minute but in the past it required three people over three minutes.

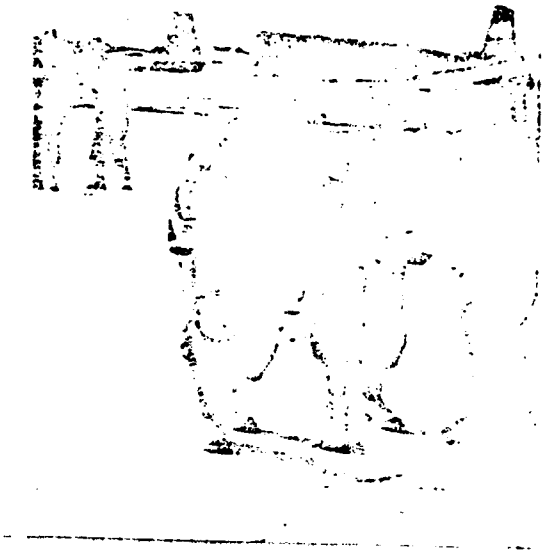

Fig. 20 A view of a Chinese Air Force aviation school airfield. In the photo, we can see the Chujiao-6 basic training aircraft made by China (photo by Xinhua News Agency).

Fig. 21 Derivatives of the Jian-6 fighter made by China: the Qiang-5 ground attack aircraft in its early configuration. Its rear fuselage strongly resembles that of the Jian-6 while the radome shows no trace of IFF installations.

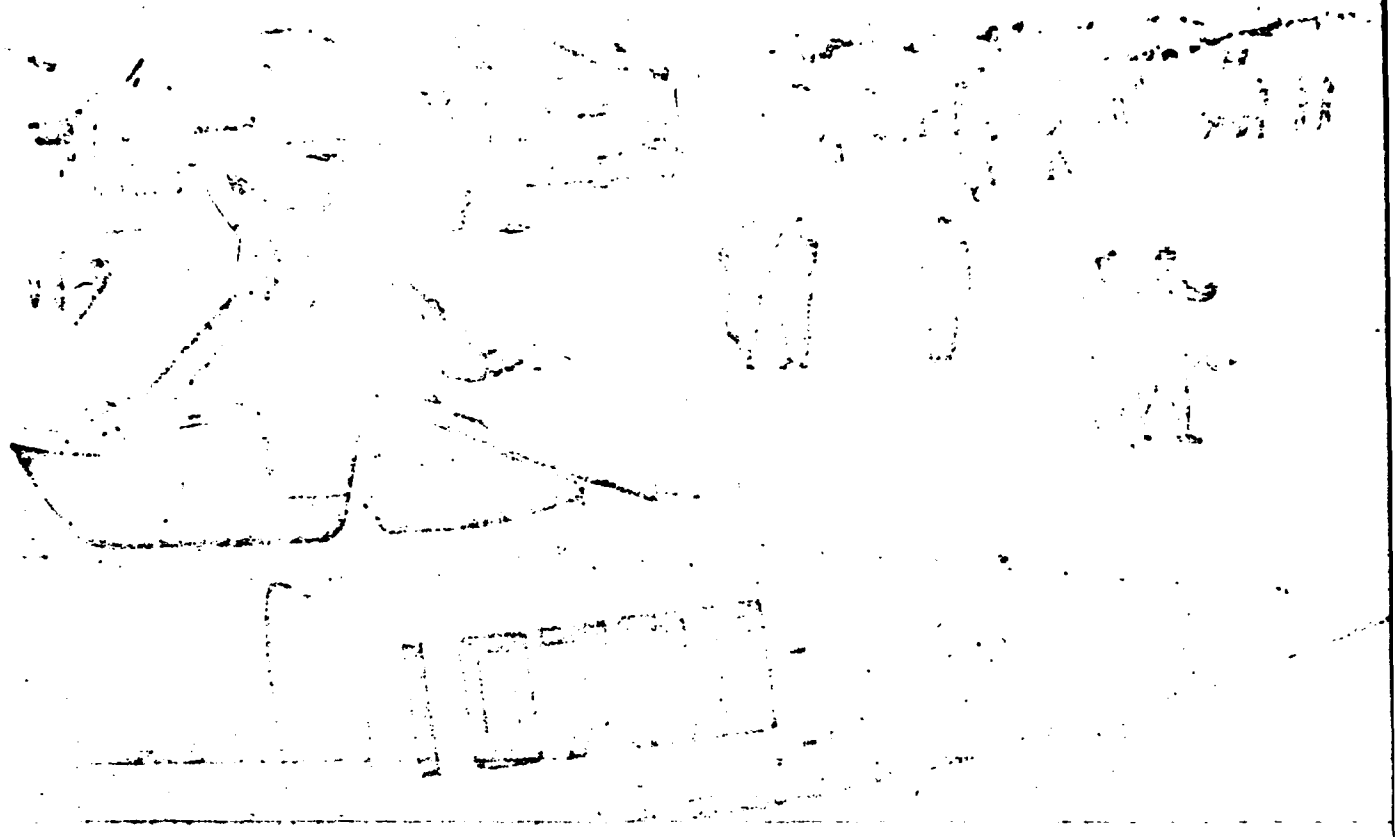

Fig. 22 Modified Qiang-5 variant featuring the SRO-2 IFF antenna below the radome and its rear fuselage differs significantly from that of the Jian-6 (photo by Xinhua News Agency).

Fig. 23 A light helicopter recently developed by the Nanjing Aeronautics Institute carrying out test flights.

According to statements, the "Spey" engine will be able to become the power of China's new generation of bombers. At present, China's strategic air power only depends on the Soviet Tu-16, yet this aircraft is already unable to keep up with the times.

Work on China's self-designed and self-made aircraft which does not require high technology had already made advances during these years. China copied the Soviet An-12 and An-24 propeller transports and the Tu-104 jet transport; in 1975, the Weijian Aircraft Factory of Harbin developed light transport Y-11 with piston propeller thrust; at the least, China also developed two light multipurpose helicopters yet at present the production of these two aircraft is still unclear. However, the Chujiao-6 aircraft put into service in 1961 has now completely replaced the Chujiao-5 and become the basic training aircraft of China's Air Force troops. Several thousand of these aircraft have already been produced and aside from service in China's Air Force and Navy, it has also been supplied as military assistance to Albania, Tanzania, Zambia etc. According to statements, the performance of this aircraft is very good and to date none of these aircraft have had unexpected accidents. Moreover, after flight students went through training with the Chujiao-6, they could directly carry out flight training on high level jet training aircraft and it was not necessary to go through transitional flight operations with intermediate level training aircraft.

Although the scale of China's aircraft industry is very large and there have been advances over the past more than ten years, yet it is naturally lacking in the basis of extensive research and development. Its production methods are still "Chinese" - many parts of Chinese aircraft are still made by hand. As a result, they often do not meet standards and thus the exchange of spare parts is very difficult. The design technology imported from the West has no way of producing high level modernized aircraft. China must also bring in modernized manufacturing techniques and try hard to develop power equipment, functional

equipment and various types of aviation electronic equipment. At present, China's aircraft industry can annually produce about 100-120 obsolete Jian-6 aircraft which were designed at the beginning of the 1950's.

(Note 1) Another explanation in the West is: China and the Soviet Union signed a licensing agreement in Moscow in November 1952 to produce Yak-18 (Max) primary training aircraft and 160 horsepower five cylinder M-11-FR engines in Shenyang. The Yak-18 produced in Shenyang was called the Chujiao-3. By January, 1958, China and the Soviet Union reached an agreement to give China special permission to produce the Yak-18A and AI-14R engine.

(Note 2) An aircraft successfully test flown in China by the Soviet Union which was transported to China in separate parts. It was then assembled in an aircraft manufacturing factory in Shenyang as a demonstration prototype.

Perspective on the Actual Strength of China's Air Force: The Organization and Equipment of China's Aviation Units

PLA acquired only a meager collection of captured Japanese and Kuomintang left-over American planes by the time the young Republic came into being in 1949. Subsequent involvement in the Korean War brought quantitative Soviet aids and enhanced development of the Air Force which instantly expanded into 22 air Divisions and 1,830 aircrafts including 1,000 MiG-15 jet fighters. The new born Air Force assumed the Soviet organization framework in the form of air armies, divisions and regiments. By the close of the Korean War, it already was the largest air force in Asia; by 1959, it had become the fourth largest in the world. During the period 1953-57, Soviet block investment provided financial support for the establishment of 14 aircraft factories which was the first impetus in favour of an indigneous Chinese aero-industry. All Soviet aids died away dramatically in the sixties, and hence on PRC adopted a self-reliance policy in the development of her own air arm.

Today, with its 5,000 aircraft and 400,000 personnel, PLA Air Force remains a predominating Asian air power. It is organized as an auxiliary arm to the ground forces, capable of air defense, close air support and medium-range bombing missions.

Heading the PLA air command are the departments of war, political and rear services, attached are also minor transport services. Air units are assigned to various military regions with strength variations in accordance to strategic vitalities. The air Division is the basic defense arm of key strategic areas, it is generally composed of three flying regiments which in turn includes three fighters wing: a fighters wing possesses 27-36 aircrafts. Each air base provides station for a fighters wing and complementary ground support units.

About 1,000 aircraft and helicopters including more than 500 civilian airlines will fall under the command of the logistics units. The 10,000 men strong airborne ground troops are also associated with the Air Commands.

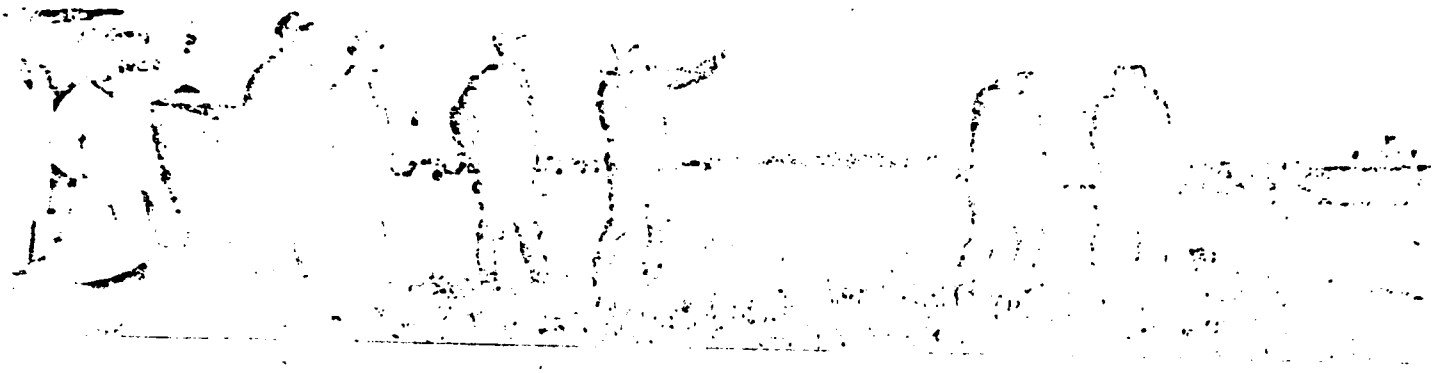

Fig. 24 Scene at a Chinese Air Force base. The picture shows three Jian-6 fighters flying low over the airfield. In the background are Jian-6 aircraft halted on a parking apron.

The People's Republic of China was established on October 1, 1949. At the same time, the air force became the air force troops of the PLA and they formally set up an air command. However, its military power was only training troops and the aircraft were only old Japanese military aircraft left over after the end of the Sino-Japanese War - and American made "Wild Horse" fighters from the Kuomintang Air Force after the end of the war of liberation. Today, it has developed into an aviation force of more than 5,000 aircraft and 4000,000 personnel.

Aside from this, the naval air troops of the naval command has, according to reports, 30,000 personnel and 700 aircraft. The equipment of the naval air troops uses coastal based fighters as the backbone and they mainly handle the air defense of key areas. With this view in mind, the Chinese navy had few aircraft and weak naval power and thus the task of its naval air troops was still monitoring along the coast and defense of key areas.

Moreover, it is generally considered that the transports for civilian use in Communist nations are commonly a component part of the air force. Civil aviation plays a partial role of air force functions in the area of transport contacts.

The Organization of China's Air Force

The air force is under the direction of the air commands and they are separately assigned to various PLA military regions. During war, they actually carry out operations under the direction of the highest command of the various military regions - the general headquarters. However, each military region has an air command, aviators and independent flying units which are under the direction of the air commands of each military region.

The air command has the three departments of war, political and rear services. The political department handles ideology which is a special political organ in Communist nations. The air commands of the various military regions also have organizations similar to the one described above: if there are units directly subordinate to the organization, they are usually organized in this way.

The war department carries out combat for the first line of troops. It is composed of radar troops, communications, scouting, aircraft guidance, battle map formulation, aircraft reorganization and transport etc. as well as anti-air attack troops, land based warning and defense troops etc.

The political department mainly uses culture and propaganda to strengthen each level of the party organization and to educate the cadres and youth.

The rear services department handles various types of training with flying as its major area, the supply of materials, equipment and clothing, the administration of health, property and other tasks. Aside from the above mentioned three departments, there are also the transportation troops which handle the transportation work and the airborne troops.

The air troops attached to each military region naturally differ in strength and number of aircraft according to the size of the military region and its importance.

Listing the military regions according to importance: first is Beijing and secondary are Nanjing, Shenyang and Guangzhou; next are the northwestern troops of Chongzhen and Lanzhou.

These military regions are political and economic centers and strategic areas along the coast. Moreover, border autonomous regions such as the Xinjiang, Uighur, Tibet, Inner Mongolia etc. are important strongholds. The others are the Jinan troops, Fuzhou troops, Wuhan troops, Kunming troops, Chengdu troops and Xinjiang troops.

In reality, the major tasks of the combat flying troops - pilots are still the air defense of key areas. In order to implement various types of air force combat, its organization takes the flying troops as essential and further it is also a string of ground support troops. For example, the radar troops, high artillery troops and ground service troops etc. are also attached to the flying troops. This is the present organizational mode.

During the founding period of the PLA, the radar troops were made into special forces and along with other troops they were each independent of the air command. However, in order to adopt unified operations and close connections with the air defense fighter troops, afterwards they were brought into the radar troops of the air force. The air defense troops were also organized into the air force in 1962. After reorganization, the high artillery troops in the air defense forces were made into an independent department; but the searchlight troops and aircraft surveillance troops were joined into the radar troops and became a department. This was a natural result of advances in aircraft equipment and military tactics.

The independent flying regiments with aviation troop strength sometimes had authority above that of the air force divisions. This was only the flying troops and they were not attached to the ground troops. This was because it had mobility which was beneficial to movement from one area to another; the independent flying regiments depended on the air force divisions to obtain ground troop support.

In principle, the organization of China's flying troops was one air force division that had three flying regiments and each flying regiment had three flying battalions. Each flying

battalion was composed of 27-36 aircraft.

Defensive Nature Combat Equipment

The number of aircraft in China's Air Force is about 5,000. Among these, the fighters are about 200 MiG-15, about 1,500 MiG-17/Jian-5, about 2,500 MiG-19/Jian-6 and about 200 MiG-21/ Jian-7. Aside from these, there is also the self-made Qiang-5 aircraft. These aircraft carry out ground support tasks.

Equipment with air-to-ground attack capability include the Tu-16 Chinese model bomber, the IL-28 light bomber, the old type Tu-4 Chinese model bomber, the Tu-2 light bomber etc. which number about 600; among these, half are IL-28. In any case, the combat strength does not have very great might and these aircraft perhaps do not have long-range attack capabilities. Yet if they obtained the special attack capabilities of nuclear equipment this would be regarded as another matter.

In the area of reconnaissance aircraft, we expect there are the MiG-17 and MiG-19 reconnaissance aircraft. Aside from these, there are also the reconnaissance variant of the Qiang-5 and it is generally believed that some of the IL-28 and Tu-16 are used for reconnaissance.

There are about 450 transports including the An-2 light transport, the Li-2 light transport, the IL-12 and IL-14 transports, the An-24/-26 etc. Aside from these, there are also the IL-18 and An-12 transports. Among these, the most numerous are the An-2 transports numbering about 300. Furthermore, there are also 40-50 American made C-46 and C-47 aircraft obtained after the war of liberation.

The MiG-15UTI is the major aircraft used for training. There are also the MiG-17 and MiG-19 two seater training aircraft; the primary training aircraft presently used is the self-made Chujiao-6 which replaced the earlier used Yak-11 and Yak-18. Some of the An-2 aircraft are also used for training.

Among the helicopters are the Mi-4, about 130 Mi-8, the SA-316 (Alouette II) and SA-321 (Super Frelon) imported from France, a small number of Mi-1 and Mi-6 etc. numbering about 350 in total.

The above listed numbers do not include light army troop support aircraft yet it is estimated that they are not very numerous. These aircraft are grouped with the army.

Further, the naval aviation troops have about 650-700 aircraft. As mentioned previously, among these the fighters are grouped in the air force's air defense system. However, the anti-aircraft guns and ground-to-air missiles attached to the navy are deployed in various naval and air force bases. The major force of the ground-to-air missiles is the SA-2/CSA-1 (Guideline) numbering more than 1,000.

Fig. 25 Pilots studying flight theory in a Chinese Air Force school. There is indoor training equipment and flight practice to help master flight techniques (photo by Xinhua News Agency).

The aircraft mainly used by the navy's aviation troops are about 500 fighters including the MiG-15, MiG-17, MiG-19 and Qiang-5 etc.; there are about 100 IL-28 light bombers, a small number of Be-6 anti-submarine patrol airships, MiG-15UTI training aircraft, some basic training aircraft and helicopters.

Viewed from this type of composition, the present state of China's Air Force is that the main forces in air and on land for the air defense protection of key areas and the long borderlines of China are still anti-aircraft fighters and aircraft possessing ground support capabilities.

The number and scale of air force bases was sharply increased and strengthened after the Korean War. The runways were also increased from the former one strip to two or three. At the same time, the runways were made longer so that no matter what type of aircraft it would not be affected by the wind direction and they could accommodate takeoffs and landings at any time. Moreover, there was an increase in the number of protection and maintenance sheltered hangars so as to protect the aircraft from enemy view. They also used topographically built underground shelters and transverse hole hangars.

The organizations often differ according to the importance of the stationed area. Usually, a base is composed of a flight battalion (three squadrons) and often turns out work from a flight squadron. Aside from flying troops, it is composed from anti-aircraft troops attached to the air command and radar signal troops. There are commonly three radar installations in one region. There are also repair, reorganization and outfitting military uniform supply and other departments; it goes without saying that there are also two corresponding transport vehicle units.

The equipment of these bases differ with the size and importance of the province and military region. Usually three to five bases are responsible for the defense of an air region. Based on the differences of each locality, even more bases can be set up in an area.

Fig. 26 Ground Service personnel of China's Air Force servicing an antenna.

Fig. 27 An air defense base of the Chinese Air Force. In the photo, we can see several Soviet style M-49 100 millimeter anti-aircraft guns.

The Strength of the Strategic Missile Forces

As mentioned previously, the task of the Chinese Air Force that is more important than attack is air defense. It is worth pointing out that the missile forces especially strategically use missile installations. Taking into consideration its nuclear transport by aircraft and the bombers of the Chinese Air Force, its might is not very great. However, it should be regarded as a different matter. Nevertheless, the nuclear troops of the Chinese armed forces are not attached to the air force but are commanded by the Second Artillery Forces. It is under the direct jurisdiction of the army command, is of equal rank with

the artillerymen, armoured troops, engineers, railway troops, communications troops, antichemical warfare troops etc. and exists independently in the form of strategic missile forces.

Among the equipment of the missile forces the main ICBM is the CSS-3. It is limited in number, its range is 6,000 kilometers and it is said that it carries a hydrogen warhead. Its accuracy is not inferior to those of advanced nations.

The equipment of the IRBM is the CSS-2 which has a range of 3,000 kilometers. It is a single stage liquid fuel thrust weapon, its might is also the hydrogen warhead and it is of the metric ton class. Its present number is about 40.

An even shorter range system than this type of missile is the MRBM. Its range is about 1,200 kilometers and it is called the CSS-1 by NATO. It is basically the same as the Soviet's SS-4 "Sandal" strategic ground-to-ground missile. Several ten have already been deployed.

An even larger ICBM is being manufactured and its range is more than 10,000 kilometers. This type of missile has a two to three stage structure: it uses liquid fuel and it is estimated that its warhead is a two metric ton hydrogen bomb. According to reports, flight tests of this missile have been carried out for some time yet its actual combat deployment will be in the beginning of the 1980's.

Airborne Force of the Air Transport Units

Above we listed the various types of troops of the Chinese Air Force's real combat force. Aside from these, it is worth mentioning the air transport units in charge of supply and transportation. Modernized warfare is different from previous warfare as it is not war of attrition; in revealing the present formidable might of the mobility of the airborne forces, transportation is not fighting in the rear but is closely related to the first line. In the present Chinese Air Force, the transports and their personnel have begun to have a substantial and important role and appear to have reached their target. Yet, at present, it still occupies an inferior position when compared to the Soviet

Union and the West. However, at present, China's medium and above transports are all foreign made or designed. It is difficult to supplement with new aircraft. At present, there are about 450-470 transports and more than 300 helicopters. Further, there are also a large number of civil aircraft which should not be overlooked. The China Civil Aviation Headquarters is guided by the State Council and Department of the Air Force. Therefore, because the more than 500 various model aircraft used for civil aviation are under the jurisdiction of the Department of the Air Force, under certain conditions, they can be requisitioned at any time and in any place. Therefore, if required, the possibility exists to put 900 to a maximum limit of 1,000 transports into use at any time. In China, the air transport units of the transport units also carry out aerial meteorological surveying and scouting, aerial measurements and aerophotography etc. These are tasks which must be given attention.

In other words, although the air transport units do not have direct combat responsibilities, yet the basic materials of war are completely made by the air transport units. It must be pointed out that there are troops in the air transport units made up specifically of women. They carry out the same tasks under the same conditions as the male units.

The airborne force is different from that of other nations. The airborne forces of all of the nations of the world are attached to the army troops: although they use aircraft, they are not a component part of the air force. However, the airborne forces (paratroopers) of China are units under the direct jurisdiction of the Air Force Command and an important part of the air force. This came about after the establishment of the Chainese Air Force Command.

Each Chinese airborne force division is composed of 799 officers and 8,300 soldiers. Each division has a reconnaissance company of 108 people and an air defense company of 98 people. Among the weapons are three ZPU-2 double-barrel 14.5 millimeter or ZPU-4 four barrel 14.5 millimeter machine guns and five 55 double-joined 37 millimeter machine guns. There are 107 people

in the engineering company, 225 people in the mortar battalion and nine 55 type 120 millimeter mortar as well as three paratrooper regiments each with 2,500 people.

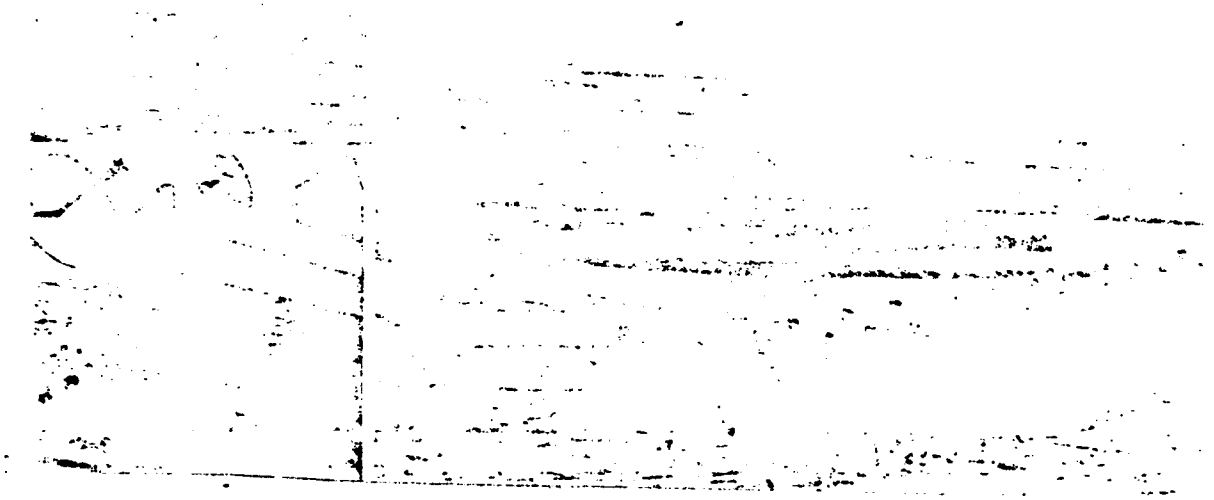

Fig. 28 Scene at a Chinese Air Force air defense base showing a number of CSA-1 SAM launchers. The missile is a Chinese copy of the Soviet SA-2 "Guideline" 1. At the bottom of left corner is a "Shange E" C waveband missile radar guidance system.

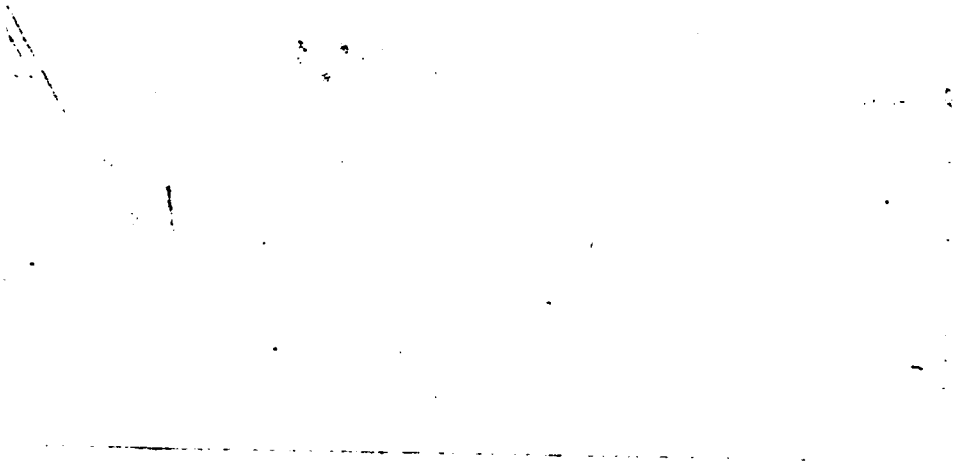

Fig. 29 The Chinese Naval Air Force in a rescue exercise. The photo shows a Be-6 maritime patrol aircraft. During the 1950's, China purchased these aircraft from the Soviet Union and later made copies of them. The Chinese name for this aircraft is not known.

Fig. 30 (see next page)

Fig. 30 The external appearance of China's strategic ballistic missiles is similar to that of the Soviet's SS-5 "Skean". It is believed that it is called the CSS-2 IRBM by the West. The range of the CSS-2 missile is about 2,500 to 4,000 kilometers and at present about 40 have been deployed. The CSS-2 missile is a liquid propellant weapon and according to Western intelligence the power section of this type of missile was used as part of the launching vehicle for the first Chinese satellite in April, 1970 (radiophoto by Xinhau News Agency).

The organization and equipment of the paratrooper regiments are the same as those of the army infantry. They are equipped with about six mortars, over seven recoilless guns and four double-joined 14.5 millimeter air defense machine guns. The airborne force were the first troops to be given 63 automatic rifles and 67 machine guns. Each of its people is relatively well equipped. External estimates of the capabilities of the Chinese Air Force greatly differ but the more reliable view is that under controlled conditions, when necessary, China can air transport units further than 8,000 kilometers for regiment level airborne missions without great difficulty yet they seem to be unable to air transport a whole division. At present, China's airborne forces have a tendency to stress parachute fighting but have not adopted large scale aircraft drops. Moreover, the troops do not have armored fighting capabilities.

There is also a special troop made up of women and their responsibilities are the defense and reconnaissance of positions.

Prospects of Importing Foreign Technology

Today, most of the combat aircraft of the Chinese Air Force are self-made copies of Soviet equipment. China has worked to develop a new generation of aircraft to replace its aviation troop equipment.

Aside from the self-made aircraft, China has also shown interest in advanced equipment from the West. China attempted to purchase the "Mirage" F-1 fighter of the Dassualt Mirage Company of France but was unsuccessful. If China was able to reach a long discussed agreement with Great Britain, purchase

the "Harrier" vertical short range take-off and landing combat attack aircraft of the British Astronavigation and Aeronautics Company and obtain special permission to produce this aircraft, China's aviation engine factories could also be permitted to manufacture the Rolls Royce "Pegasus" variable vector thrust turbofan engine. The results of the negotiations were that Great Britain had agreed to sell the "Harrier" aircraft to China yet there were no inertia navigation and attack systems on the aircraft nor were there laser range finders or various auxiliary equipment for weapons. According to reports, the reason why Great Britain refused to supply these things was because of safety. The usefulness of this aircraft was then greatly discounted and at present China's industry does not have the ability to provide a substitute. The "Harrier" combat aircraft can strengthen the forward position approach support capabilities of the Chinese Air Force and the fighting power of the naval aviation troops. Further, China has in mind to cooperate with Great Britain to develop the BAe-146 transport and the British have indicated that they would welcome China's participation in the development plans of the BAe-146.

Fig. 31 (see next page)

Fig. 31 A photo of China's airborne troops in maneuvering exercises during the Cultural Revolution. At the time, these troops were still lacking helmets but this has now been greatly improved. In the photo, the officer is holding a Type 54 7.62 millimeter pistol while a soldier is blasting a Type 58 7.62 millimeter light machine gun giving fire cover for his troops.

Fig. 32 A female PLA airborne soldier in parachuting practice. Her duties are believed to be battlefield first aid.

Deng Xiaoping, Vice-Premier of China, indicated to a group from the United States Foreign Relations Committee visiting China in the middle of April, 1979 that China was interested in the F-15 "Eagle" of the MacDonald Douglas Company and the F-16 of the General Electric Company. According to a disclosure by a Chinese official, China had tremendous interest in the F-16. However, other information sources indicated that China was also interested in purchasing the C-130 "Hercules" transport and P-3C "Orion" antisubmarine patrol aircraft of the Lockheed Company and the A-10 ground attack aircraft of the Kuaijie Company of the United States. At present, China is still continuing to appraise Western weapons and its purchasing plans are still unclear.

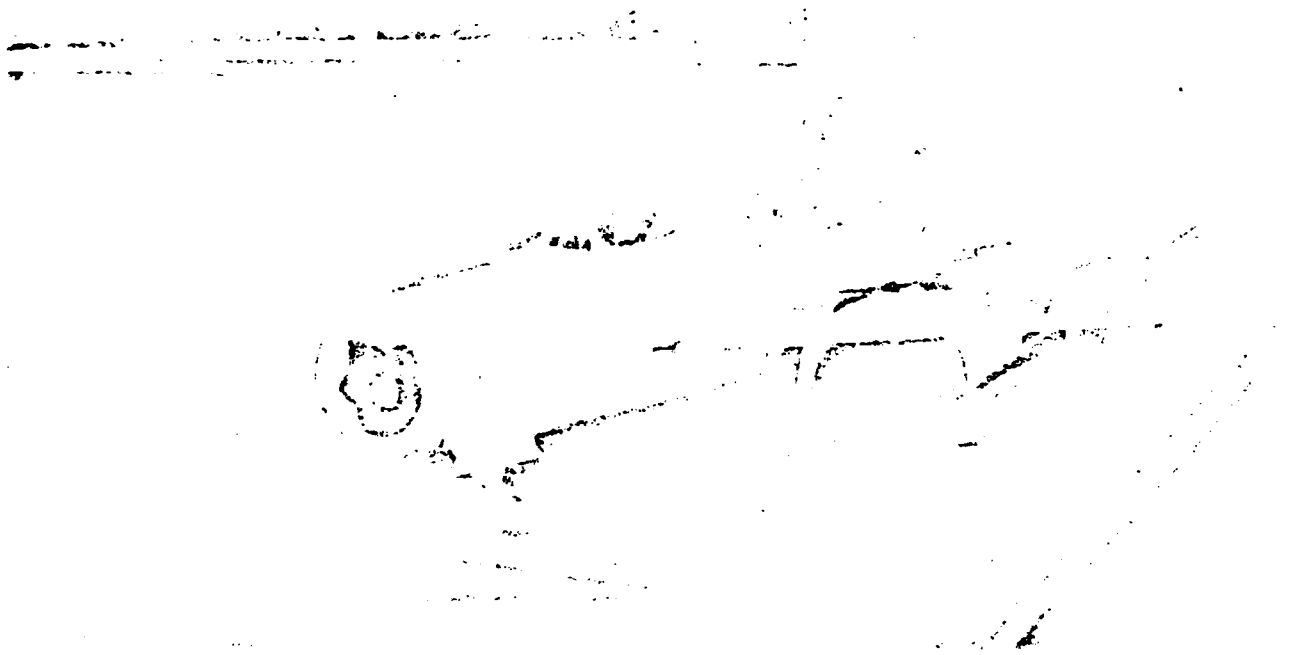

Fig. 33 A night scene at a Chinese Air Force base. Taxing on the runway is the MiG-19PF all weather fighters and Jian-6 fighters are seen on the parking apron. There are also different function Chinese variants developed later by China including the two seater training aircraft, reconnaissance aircraft etc. The Jian-6 aircraft are equipped with a new type of radar.

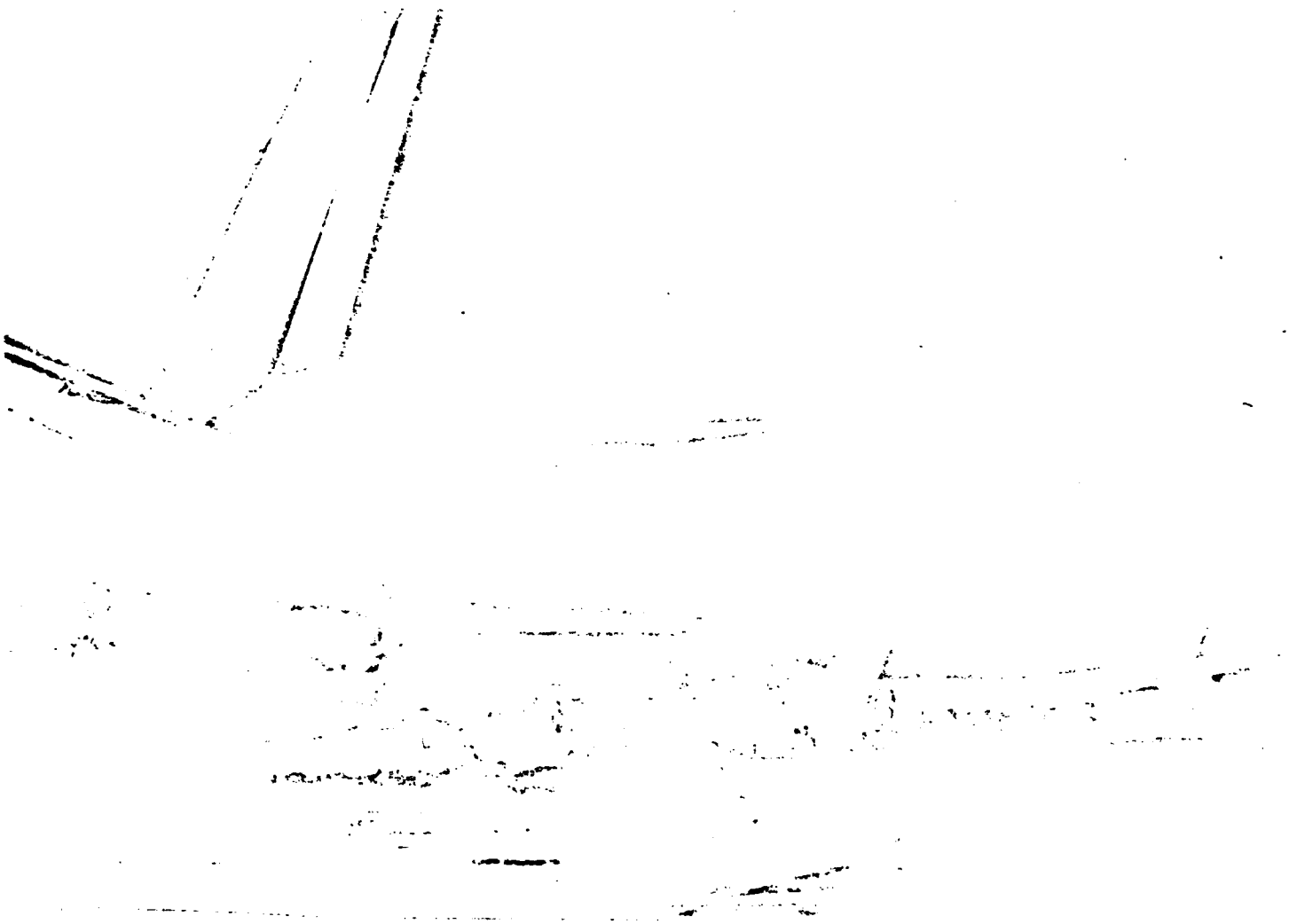

Fig. 34 Rainy night scene at a Chinese Naval Air Force base. The Hong-5 light bombers in the photo are painted with a shielding color yet the recently viewed PLA Hong-5 aircraft have been changed to a silver color. It is believed that the Hong-5 is also used for reconnaissance. The Hong-5 of the Chinese Naval Air Force can be equipped with torpedoes for torpedo attacks.

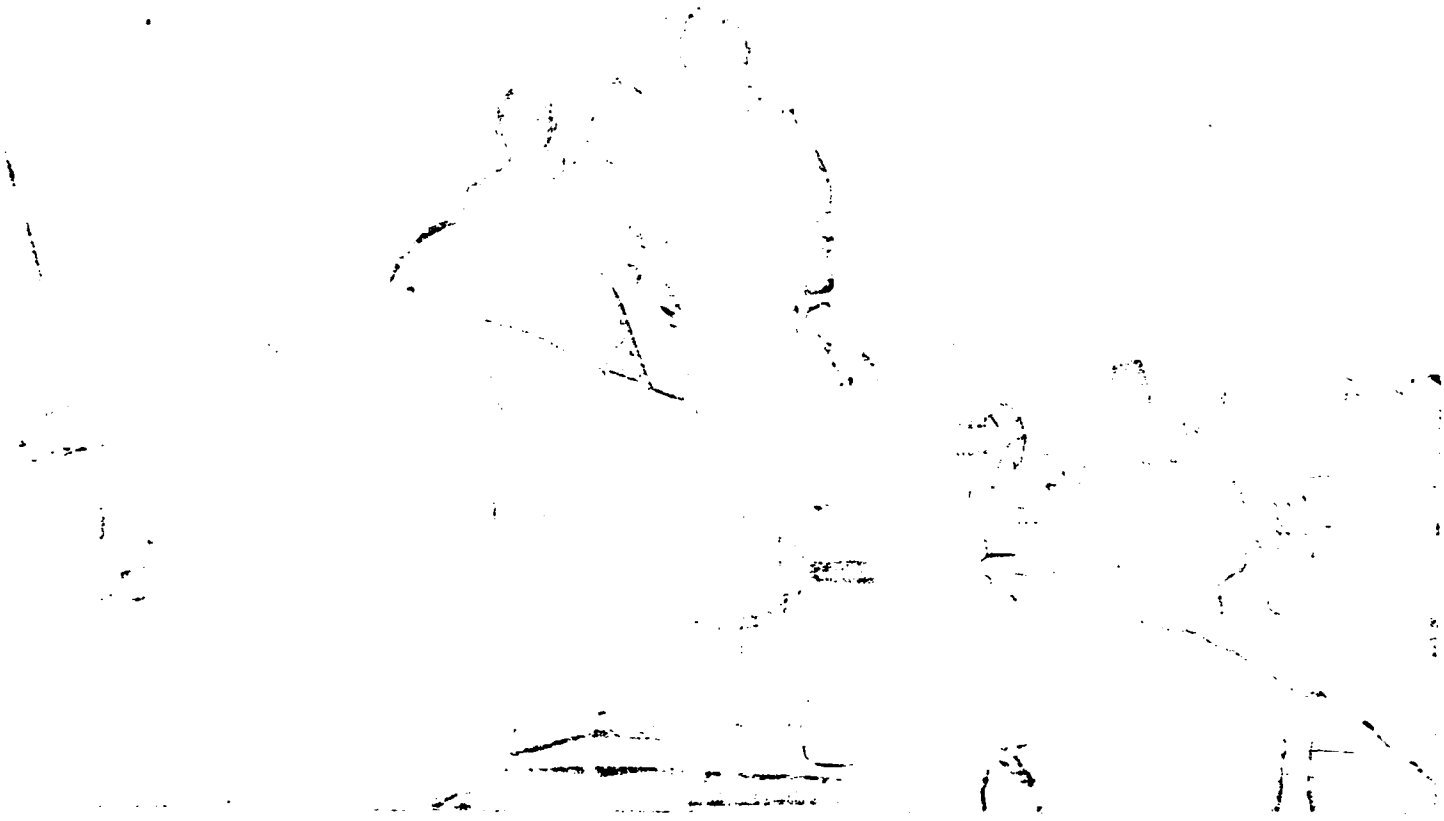

Fig. 35 Student pilots of the Chinese Air Force's aviation school boarding a Chinese made Chujiao-6 primary training aircraft (photo by Xinhua News Agency).

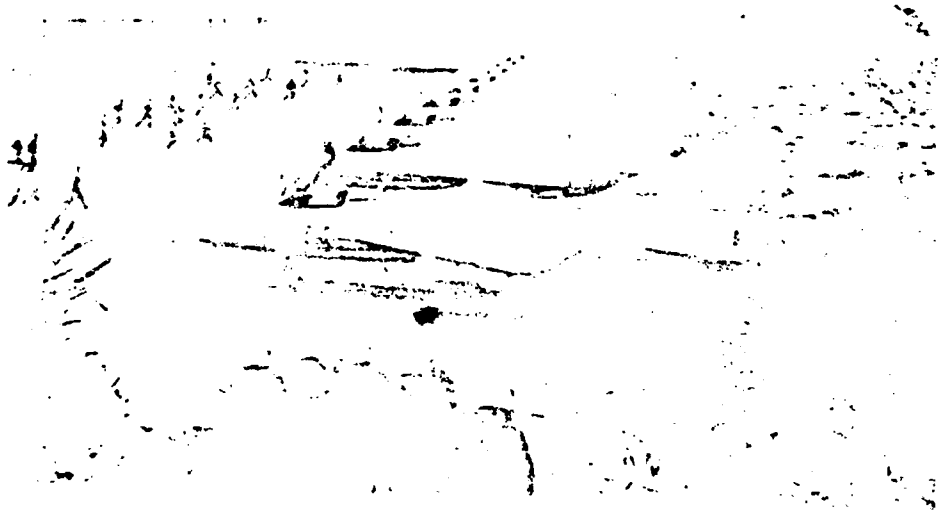

Fig. 36 (see next page)

Fig. 36 The Jian-7, a copy of the Soviet MiG-21F fighter, is a standard daytime fighter equipped with two AA-2 air-to-air missiles.

China is also developing its own aircraft weapons systems yet development is quite slow as is the development of air defense weapons. At present, the equipment in this area is mainly copies of Soviet models. Aside from these, it is reported that China purchased the Matala R-530 and R-550 "Magic" air-to-air missiles from France and is buying France's "Rattlesnake" air defense missile system.

At present, there is a distance between the level of China's aviation equipment industry in the areas of engines, aviation electrical equipment, metallurgy and weapon systems and that of advanced nations. China is naturally striving to improve this situation but it appears that their ability does not equal their ambition. It is not easy to realize the importation of advanced foreign equipment within a short period of time.

Above, we unsystematically gave the essentials of the Chinese Air Force. At present, the Chinese Air Force which is ranked third in the world behind the United States and the Soviet Union is moving along an uneven path especially after the internal conflicts of the Cultural Revolution.

Nowadays, the Chinese Air Force is trying hard to recapture the lost time caused by the Cultural Revolution and within a short period of time to build a modernized air force. In order to realize modernization, they are adopting various measures. Recently, Sino-American relations have improved and this can greatly give impetus to its advancement. However, as regards the various difficulties involved in the path of modernization for the Chinese Air Force, the problem of what methods to use to succeed is still very difficult to solve.

In order to defend the vast border areas and long boundary lines, the deployment of vast numbers of aircraft and qualified personnel is very important.

The Chinese Air Force has had firsthand experience of relying on false political ideology and thus it was difficult for

modernized military technology to advance. China's future growth and its process is worth keeping an eye on.

Several Fighters Made by China - the Jian-6, Qiang-5, Hong-5 and Hong-6

The general establishment of the Chinese Air Force has 490,000 people and 5,300 military aircraft. The main composition of these aircraft include 100 Hong-6/Tu-16 medium bombers, 450 Hong-5/IL-28 light bombers, 500 Jian-4 and Qiang-5 ground attack fighters and more than 4,000 of the following fighters: an estimated 300 Jian-5/MiG-17, 3,000 Jian-6/MiG-19, 250 Jian-7/MiG-21 and 50 Jian-8/MiG-23.

Below we will use public materials to describe the characteristics and development of several major types of PLA military aircraft.

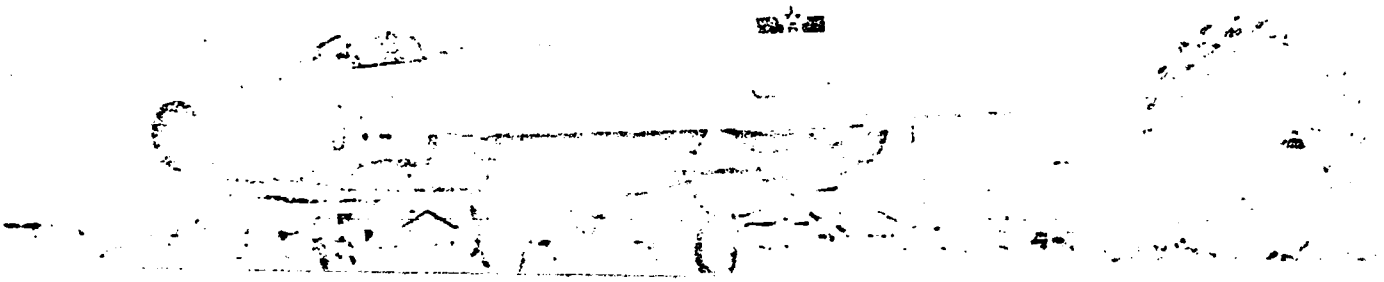

Fig. 37 The Jian-7/MiG-21 fighter of the Chinese Air Force.

Fig. 38 The Jian-6 and Jian-7 fighters seen on a parking apron of a Chinese Air Force base.

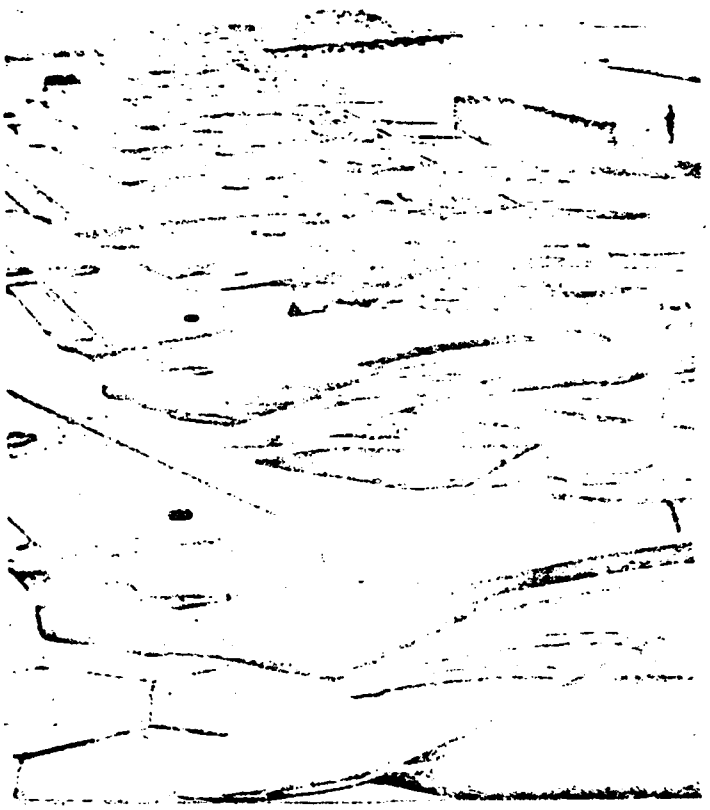

Fig. 39 At present, the Chinese Air Force has about 3,000 Jian-6 fighters. They equip more than forty fighter regiments including a small number of naval air force troops. At present, the Shenyang aircraft factory produces 30 Jian-6 per month.

The Jian-6 Fighter Made in Shenyang
Chinese name: Jian-6 fighter
NATO name: Farmer-C-MiG-19SF and Farmer-D-MiG-19PF

The Jian-6 is basically a Chinese made MiG-19 fighter. The original designer was the Mikoyan Design Bureau of the Soviet Union. Its I-350(M) or 1360 prototype used the "Mikulin" AM-5 non-afterburning engine which was first flown on September 18, 1953.

The first batch of MiG-19 daytime fighters were equppped with two AM-5F (acceleration: afterburning) turbojet engines. NATO

calls it the Farmer-A. The net power of each engine is 22.06 kilonewton which is 4,960 pounds net thrust and during afterburning it is 29.81 kilonewton which is 6,702 pounds net thrust. The high altitude maximum flight speed is 1.1 mach and in the beginning of 1955 it was put into service for the Soviet air defense troops. Afterwards, they changed to use the R-9BF engine modified MiG-19F. Later, there were continuous improvements and production reached to quite a few aircraft.

The modified items included the ventral air brake, dorsal fairing and even larger dorsal fins yet the most important aircraft frame improvement was still the use of the full power horizontal fin to replace the originally relatively low horizontal fin - the elevating rudder. After improvements, the name was changed to the MiG-19S (stabilization: horizontal fin type) called the Farmer-C by NATO. The other improvements of the MiG-19S were the change to the use of the Tymansky R-9B engine (specified net power is 25.50 kilonewton which is 5,732 pounds net thrust and during afterburning it is 32.36 kilonewton which is 7,275 pounds net thrust); the internally installed weapons were changed and three 23 millimeter NR-23 machine guns were used; the left and right wings carry bombs or one air-to-ground rocket. The total specified weight of this type of aircraft is 7,400 kilograms (16,314 pounds) and after changing to use the R-9BF jet engine with an improved afterburner, the weight increased 200 kilograms (441 pounds) and its name was changed to the MiG-19SF.

Around 1957, the Soviet Union put the semi-all weather MiG-19P (Perekhvatchik: interceptor) into production which is called the Farmer-B by NATO. The engine used by this aircraft is the R-9BF, there is a small emerald radar scanner in the air inlet, a range finder on top of the air inlet and two NR-23 machine guns. Afterwards, the MiG-19PF appeared and its distinction was in the NR-30 machine gun mounted on the wing and two ARS-212 rockets mounted under the wing. The difference between the MiG-19PM and MiG-19PF was the use of four first generation radar seeking rockets (called the Alkali by NATO), to

replace the machine guns. The PF and PM modified models are called the Farmer-D by NATO.

The MiG-19 produced by the Soviet Union also has a reconnaissance aircraft and training aircraft. The MiG-19R (Razvedchik: reconnaissance aircraft) has cameras mounted on the lower front section of the fuselage and the wings are equipped with two NR-30 machine guns; the MiG-19UTI is then a front and rear two seater training aircraft.

At the end of the 1950's, the Soviet Union gradually stopped production of the MiG-19 and in January, 1958 they signed an agreement with China giving special permission for its manufacture. Just before the degeneration of relations between Moscow and Peking, many MiG-19 had been sent to China. The Jian-6 is a Chinese model of the MiG-19S fighter. It was first flown in December, 1961 and in the middle of 1962 it became standard equipment of the PLA Air Force. The production of the Jian-6 steadily rose from 1966 and today there are several thousand including the MiG-19PF/PM and MiG-19SF copies. China also developed a group of modified models and among them was a type of tactical reconnaissance aircraft. The lower front section of the fuselage is equipped with cameras and is very much like the MiG-19R. In July, 1977, a pilot flew from an air force base in Fujian to Taiwan and the aircraft was a Chinese modification of an originally Soviet equipped model. The lower front section of the fuselage dismantled the 30 millimeter machine guns and installed camera equipment for use on two sides. According to reports, this aircraft belonged to the first reconnaissance aviation troops. The wing root had two machine guns but no shell firing marks. The cabin radar antenna hood shaped variation in some semi-all-weather aircraft assumed a fine and long cone shape. Another modified model now in service is the Jianjiao-6 teaching aircraft. This aircraft has two front and rear seats and is very much like the Soviet-built MiG-19UTI. The Qiang-5 strike fighter developed from the Jian-6 will be introduced below.

Not long after the Indian-Pakistan War in September, 1965, China began to supply Jian-6 to Pakistan. The first batch consisted of 40 aircraft and the first Pakistan flying squadron put them into service within one year. By 1981, Pakistan had 135 Jian-6 to equip nine Pakistan air defense and ground attack flying squadrons. The Jian-6 of the Pakistan Air Force has missile launching tracks under the wings, each wing carries one "Rattlesnake" missile and at present there is an auxiliary fuel tank placed on the belly of the aircraft. In the spring of 1974, a battalion of the Tanzmanian Air Force obtained many of the Jian-6 which could equip a flying squadron. Egypt obtained 40 including some Jianjiao-6 twin-seater training aircraft. Aside from these, Albania, Bangladesh, Kampuchea and Vietnam obtained more than 100.

Fig. 40. According to reports, the Qiang-5 strike fighter (ground attack aircraft) was successfully developed by China at the end of the 1970's and manufactured in Nanchang. Western intelligence organizations estimate that there were already 210 Qiang-5 in service by 1972.

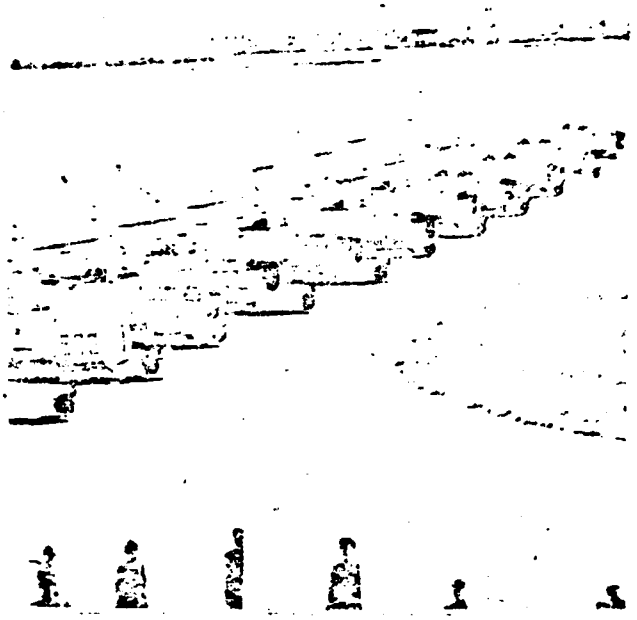

Fig. 41 China acquired permission to license produce the Jian-6, a Chinese copy of the Soviet MiG-19, in January, 1958. China produced the first Jian-6 in December, 1961 and it began active service in the PLA Air Force in the middle of 1962.

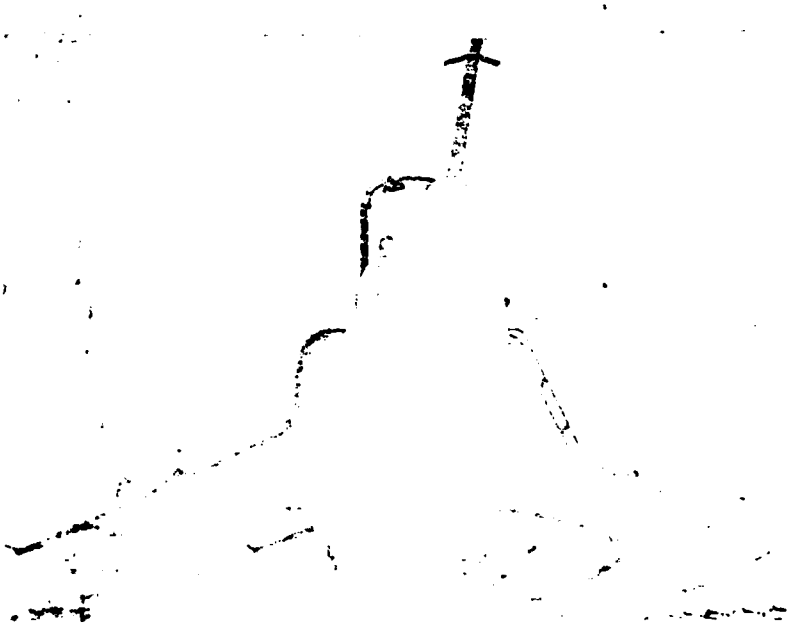

Fig. 42 The Qiang-5 is powered by two "Wopen-6" (Soviet R-9B-811) engines. Its high altitude level flight speed can reach mach 1.35.

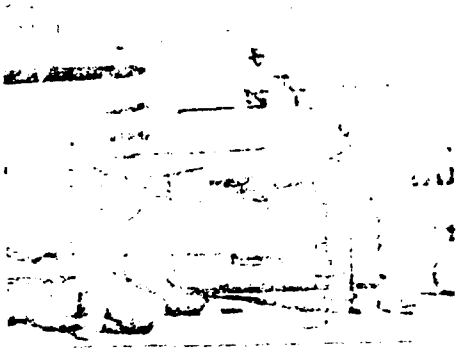

Fig. 43 The Jianjiao-6 twin seater jet training aircraft is a Jian-6 variant and its external appearance is similar to that of the Soviet MiG-19UTI.

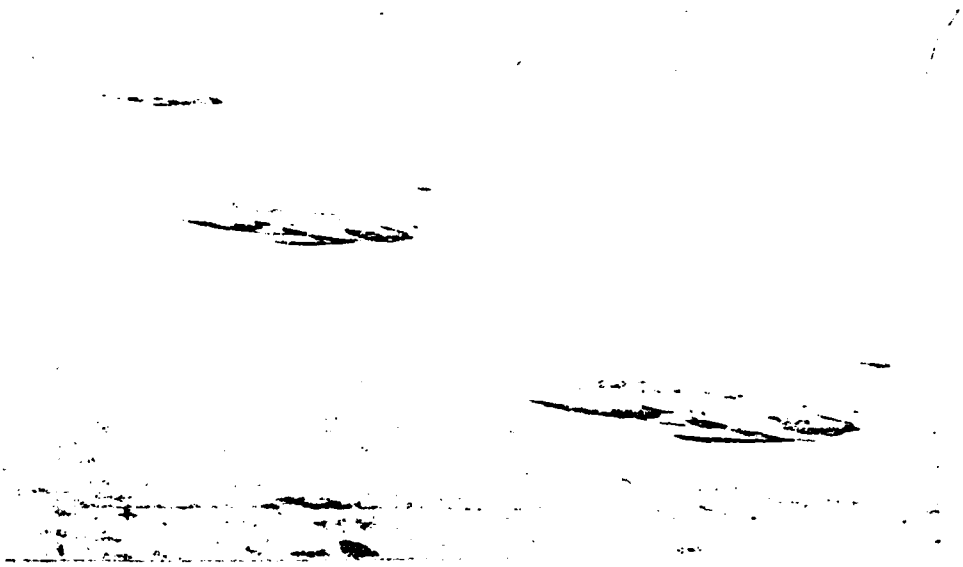

Fig. 44 The Qiang-5 strike fighter is already being mass produced. China is reported to have exported 65 Qiang-5 to Pakistan in 1980 and 1981.

More than 40 air force regiments in the Chinese Air Force use the Jian-6 and each regiment has three to four flying squadrons. The duties of the Jian-6 include air-to-air interception, fighting area blockades, close support, air defense and tactical reconnaissance. The PLA naval aviation troops are also equipped

with a small number of Jian-6.

At the beginning of 1980, American aviation industry personnel visited China. China introduced the Shenyang aircraft factory as being able to manufacture 30 Jian-6 per month yet this factory's main responsibility at that time was overhauls. It is believed that at present the production of this factory can satisfy domestic replacement and export sales requirements.

The Qiang-5 Made in Nanchang

Chinese name: Qiang-5 strike fighter

NATO name: Fantan-A

Qiang-5 Specifications (estimated):

Wingspan : 10.20 meters (33 feet 5 inches)

Total length: 1,525 meters (50 feet)

Empty weight: 6,200 kilograms (13,670 pounds)

Maximum takeoff weight: 10,700 kilograms (23,590 pounds)

Maximum landing weight: 9,200 kilograms (20,280 pounds)

Maximum high altitude level flight speed: 1.35 mach (775 knots; 1,435 kilometers/hour; 890 miles/hour)

Maximum low altitude level flight speed: 0.95 mach (625 knots; 1,160 kilometers/hour; 722 miles/hour)

Combat radius with four 250 kilogram bombs and a two hour auxiliary fuel tank under the wing: low-low-low 200 nautical miles (370 kilometers, 230 miles), high-high-high 350 nautical miles (650 kilometers, 400 miles)

Flying distance when there is a two hour auxiliary fuel tank under the wing: 1,000 nautical miles (1,850 kilometers/ 1,150 miles)

Maximum ocean surface climbing rate: 6,000 meters (19,685 feet)/ minute

Operating ceiling: 16,000 meters (52,500 feet)

Takeoff runway distance: 620 meters (2,035 feet)

15 meters (50 feet) from takeoff to liftoff: 920 meters (3,020 feet)

Landing runway distance: 900 meters (2,950 feet)

The Qiang-5 twin engine fighter bomber was developed from the Chinese made Jian-6/MiG-19. In the past, the West erroneously called it the F-9 or "F-6 auxiliary." The Astronautics Industry Delegation of the United States visited China in 1980 and at that time Chinese officials announced its official name. According to Chinese spokesmen, the Qiang-5 was designed about ten years ago.

The frame of the Qiang-5 is based on that of the Jian-6, only the total body dimensions have been enlarged. The wing structure is basically unchanged and the four exterior adhesion points and large critical laminar flow grid from the Jian-6 were kept. The two sections in the front of the fuselage were made larger. The inside weapons cabin is very important for the strike fighter and thus during design each instrument in the middle section is moved to the "solid" ogival nose and the two engine air inlets are arranged on the two sides of the single-seater pilot's cabin; the middle section of the fuselage enlarged the usable section based on the area law. The pilot's cabin hood was changed to a rear hinged lift up type and the rear back fairing was made even deeper. The rear two sections of the fuselage kept the various vents and exterior air inlets of the Jian-6 and based on this, we can determine that the two Shenyang made Kumansky R9BF turbo jet engines "Wopen-6" of the Qiang-5 jet aircraft have basically not been changed. Some reports consider that the Qiang-5 uses the R-9B-811 engine with a rated net power of 25.5 kilonewton (net thrust is 5,732 pounds). When afterburning, it is 36.77 kilonewton (net thrust is 8,267 pounds). The main fin is higher than that of the Jian-6, the dorsal fin is smaller and the tail bottom plate fairing is shorter. The horizontal tail surface including the surface anti-buffeting hammer appear to be the same as that of the Jian-6. The other areas which have similarities to the Jian-6 are: the nosewheel comes up towards the front, the main landing gear comes into the two wings and there is a drag parachute in the tail cone.

The right wing of the Jian-6 has a 30 millimeter mach gun but on the Qiang-5 it is shifted past the wing root area outside

the engine air inlet duct. Below the wings are conventionally mounted: two 800 liter (176 gallon) auxiliary fuel tanks hung on the support outside the aircraft and two launching bays on the support in the aircraft each of which can fire 57 millimeter air-to-ground rockets (S-5 or a similar type) or two 250 kilogram bombs. The weapons bay in the aircraft is installed behind the air brake and can hold four 250 kilogram bombs. On the two sides of the bomb bay outside the aircraft are also bomb racks which can hang two 250 kilogram bombs.

The actual situation of the electronic instruments carried by the Qiang-5 is not clear yet some reports consider that the electronic instruments probably include the SRO-2 energy and foe identifier (called the Odd Rod by NATO), the ARK-5 radio compass, the RV-UM low altitude radio altimeter, the MRP-48P beacon receiver and the RSIU-4 very high frequency communications transceiver. There is a camera bay on the right side of the nose and on the square bottom plate in the front section of the fuselage are landing lights.

According to reports, in 1979 the Chinese Air Force had at least 210 Qiang-5 making up a squadron of tactical strike fighters. In 1980, reports stated that the Qiang-5 military aircraft was in large scale production.

The Qiang-5 is also deployed to the air defense troops of the Chinese naval aviation troops. According to reports, between 1980 and 1981 the Pakistan Air Force received about 65 Qiang-5 replacing the Jian-6 used by thre squadrons.

The Hong-5 Made in Harbin
Chinese name: Hong-5 bomber
NATO name : Beagle-IL-28 or Mascot-IL-28U

The Chinese made Hong-5 is equivalent to the Soviet three seater tactical light bomber IL-28 and is the equipment for about 12 air force regiments of the PLA. Another more than 100 are attached to the naval aviation troops.

According to American military situation reports for the 1979 fiscal year, China had 400 IL-28 in service and military

situation reports for the 1981 fiscal year state "Some IL-28 medium range bombers possibly carry nuclear weapons. The "Badger" and "Hound" are still being produced. The range of the "Hound" is limited and can barely be used for long range fighting." The latter report is the first official disclosure that China is still producing the IL-28.

The IL-28 was first developed by the Yiliuxin Design Bureau of the Soviet Union. In 1964, aside from this aircraft, the Soviet Union also made the Su-10 and various prototype of the Tupolev. In competitive designs, the IL-28 is a noticeable leader. In 1947, under orders by Stalin, priority was given to the development of the IL-28.

Three prototypes of the IL-28 were made and the first was test flown on August 8, 1948. This aircraft used two RD-45 centrifugal turbojet engines, the net power of each engine was 22.3 kilonewton (static thrust was 5,004 pounds) and it copied the British Rolls Royce NENE engine. In the spring of 1949, the Soviet Union formally completed government checks and in 1950 Stalin personally ordered the arrangement of 25 IL-28 to participate in that year's 1951 Hongchang flight inspections. Some people consider that some or all of these aircraft were small scale test-made products which possibly used the variant RD45FA of the RD-45 engine with a rated net power of 26.9 kilonewton (6.040 pounds static thrust).

At the end of the summer of 1950, the Soviet tactical air force troops began to use the IL-28 and the next year the Soviet Union began large scale production of this aircraft. By about 1960, they had made several thousand. The Soviet Union had many factories producing the IL-28 and Czechoslavakia also made this aircraft called the B-228. This mass produced aircraft used the VK-1A engine which was a new improved engine made by the Klimov Bureau based on the RD-45 engine.

About 500 of the IL-28 produced by the Soviet Union were supplied to Communist and Socialist nations including Afghanistan, Algeria, Bulgaria, Cuba, Czechoslavakia, Egypt, Finland, East Germany, Hungary, Indonesia, North Korea, Nigeria, Poland,

Romania, Somalia, South Yemen, Syria, North Vietnam and North Yemen. The Soviet Union provided an equal number of IL-28 to China. After the Sino-Soviet split, China obtained special permission to manufacture the IL-28. Some of the IL-28 manufactured by China were exported to Albania. The Harbin factory also produced a twin control IL-28.

Fig. 45 In a bomber drill at a certain Chinese Air Force base, flight crew and ground service personnel join to load bombs on a Hong-6 military aircraft.

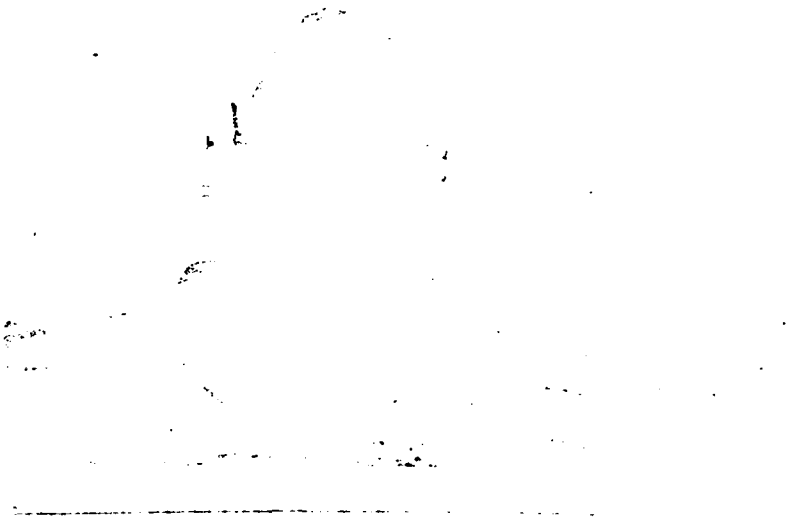

Fig. 46 The Hong-6 was basically designed according to the Soviet Tu-16 " Badger". Mass production began in 1968 and it is conjectured that China is developing reconnaissance and tanker variants of the Hong-6. China supplied spare parts for the Hong-6 to Egypt to help service Egypt's Tu-16 bombers.

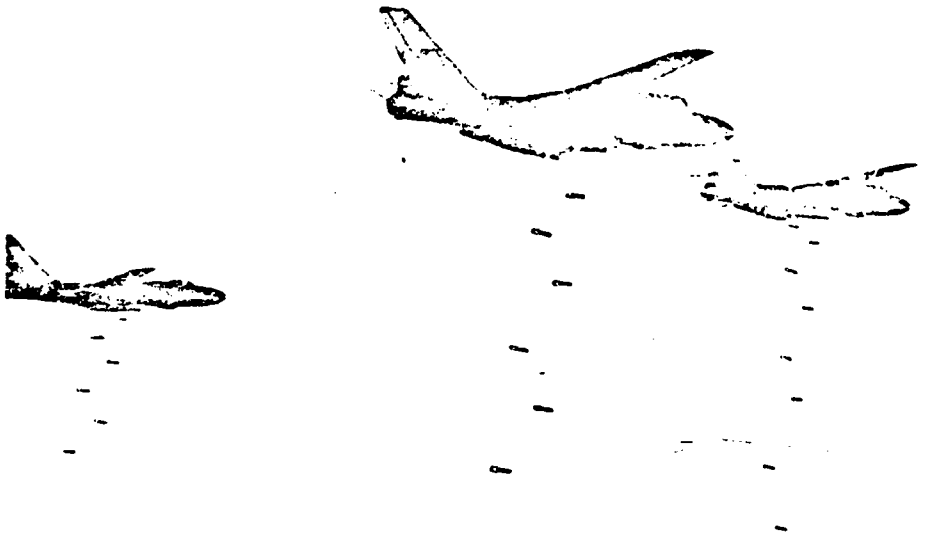

Fig. 47 The Chinese Air Force has about 450 Hong-5 light bombers which were licensed produced by Harbin Aircraft Factory.

Fig. 48 At present, the Hong-6 is the only Chinese bomber with the capability of delivering nuclear weapons. According to reports, before 1971, China carried out 12 nuclear weapon tests and all of them used the Hong-6.

Fig. 49 According to London International Strategic Institute's 1981 publication, "Military Parity," China already has 10o Hong-6 bombers.

The Hong-6 Made in Xian

Chinese name: Hong-6 bomber (Type 6 Bomber)
NATO name : Badger

In 1958, China obtained a license to assemble Tu-16 bombers but in 1960 after the Sino-Soviet split assembly work was halted. Roughly two years later, production plans were resumed. At the time, the Soviet Union had already recalled its experts and duplication design work was very burdensome. By about 1968, China formally supplied nationally produced Hong-6. Prior to 1971, among 12 air-dropped nuclear devices, six used the Hong-6 to make drops in Luobubo; the production rate of progress of the Hong-6 aircraft was slow and up to the beginning of the 1970's only about 60 were made.

The American 1979 Fiscal Year Military Situation Report considered that: "There are over 80 of these Soviet designed bombers in service. Based on the design blueprints of the "Badger," it is estimated that there have not been very great changes made. The production of anti-electronic interference devices is limited and the reconnaissance and tanker models are possibly put into service at any time. It is possible that in the future they will also make an air-to-ground missile transport." The 1981 Fiscal Year Report confirmed that China is still producing the Tu-16. China also supplied spare parts for the Tu-16 to Egypt.

The Jianjiao-5 and Jianjiao-6 Training Aircraft

The two high class training aircraft have been in production and service in China for many years yet there is still not much material in Western nations related to them although these two training aircraft have already been exported to at least two nations connected to China. To date, China has developed the MiG-17 into a two-seater training aircraft called the Jianjiao-5 and manufactured it in Shenyang. According to preliminary materials obtained by the West, this training aircraft has been in service in Pakistan for many years. Another newer model manufactured in Shenyang is the two-seater Jianjiao-6 teaching aircraft developed from the MiG-19SF which is still unknown to Western personnel although it was in service earlier in Egypt and Pakistan.

The development backgrounds of these two training aircraft are worth investigating because they can provide an important development direction of China's aviation industry. For example, the relatively early developed Jianjiao-5 is a purely Chinese aircraft model because there is no similar two-seater MiG-17 training aircraft in service in the Soviet Union.

The Jianjiao-5 was developed from the Jianjiao-2 or MiG-15UTI and was made by combining the designs of the Jian-5/ MiG-17. It has a VK1 non-afterburning centrifugal jet engine with a thrust of 2,700 kilograms. The speed is limited to subsonic and non-transonic capabilities and the maximum speed is about 0.92 mach. The horizontal fin is fixed and non-all-moving. This is perhaps one reason why the Soviet Union did not develop the MiG-17 into a training aircraft.

Although the appearances of the Jianjiao-5 and MiG-15UTI are similar, yet because it integrates the Jian-5 there are many differences. The rear fuselage of the Jianjiao-5 is 35.4 inches longer than that of the Jian-5, the back oblique angle of the fin is enlarged and the wings are the same as those of the Jian-5. When compared with the MiG-15UTI, there have been many improvements in control. In diving performance, the MiG-15UTI has noticeable insufficiencies but the wings of the Jian-5 are

longer and thinner and the internal oblique angle is 45 degrees while the external oblique angle is 42 degrees. Three huge spoilers are added on causing control to be even easier.

The layout of the pilot's cockpit, both inside or outside is basically the same as that of the MiG-15UTI. However, the Pakistan Air Force still has several Jianjiao-2 (MiG-15UTI) used for training. In Pakistan, beginning in 1975, the Jianjiao-5 replaced the Luoxie T33 and F86 (Sabre) as high class training aircraft. The student pilots of the fighter training troops of the Pakistan Air Force required 100 forty-five minute Jianjiao-5 training classes before they could transfer into the combat training troops.

The classes of the fighter training troops included basic weapons training. The Jianjiao-5 has a 23 millimeter machine gun on the starboard and matching rangefinding radar on top of the air inlet. In the last seven years, the Jianjiao-5 has gained a good reputation in the Pakistan Air Force and is considered to be more solid and reliable than the T-33. Moreover, the teacher in the rear seat has a better line of vision. A blemish in an otherwise perfect aircraft is that the life of its engine is relatively short. Major overhauls are required every 200 hours. It is believed that aside from the Pakistan Air Force, China has possibly also supplied the Jianjiao-5 to other nations which use Chinese aircraft.

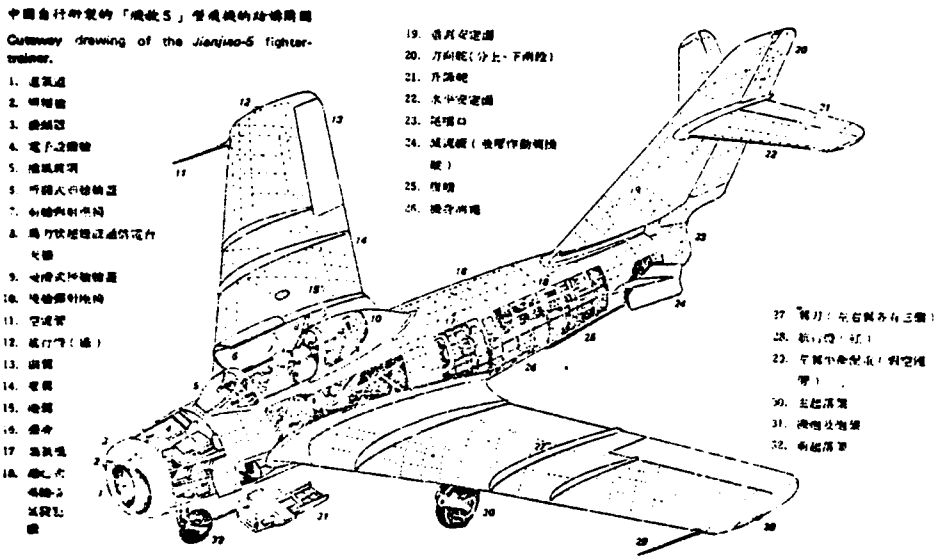

Fig. 50 Structural diagram of the Jianjiao-5 training aircraft.

Key: (1) Air inlet; (2) Camera bay; (3) Nose hood; (4) Electronic equipment cabin; (5) Windshield; (6) Bent front cabin hatch; (7) Front cabin ejector seat; (8) Horsepower ultrashort communications transreceiver antenna; (9) Rear slide type rear cabin hatch; (10) Rear cabin ejector seat; (11) Airspeed head; (12) Navigation light (green); (13) Aileron; (14) Flap; (15) Wing; (16) Fuselage; (17) Oxygen bottle; (18) Centrifugal turbojet engine; (19) Vertical fin; (20) Rudder (divided into upper and low sections); (21) Elevator; (22) Horizontal fin; (23) Jet exit; (24) Drag plate; (25) Ventral fin; (26) Fuselage fuel tank; (27) Fence (the left and right wings each have three); (28) Navigation light (red); (29) Left wing balancing bob-weight (false airspeed head); (30) Main landing gear; (31) Machine gun and gun mount; (32) Front landing gear.

The wingspan of the Jianjiao-5 is 9.63 meters, the same as that of the Jian-5, yet the length is 11.46 meters greater and the height is increased by 3.8 meters. The highest speed per hour checked by the Pakistan Air Force was 486 nautical miles (902 kilometers) and the altitude was 9,753 meters (32,000 feet); the highest flying altitude was 13,715 meters (45,000 feet)

and the maximum endurance with two auxiliary fuel tanks, each 400 liters (88 gallons), was 2 hours and 38 minutes.

Although the Soviet Union built a limited number of MiG-19UTI, yet because the Soviets considered the use of the MiG-19 two-seater training aircraft as transitional period flight training and unnecessary, the manufacture of MiG-19UTI was very quickly halted. However, the Jianjiao-6 built in Shenyang does not seem to have many borrowed areas from the MiG-19UTI. For example, the Russians only eliminated the equipment behind the cockpit of the MiG-19 so as to mount a second seat and make a training aircraft. The Jianjiao-6, however, lengthened the fuselage of the Jian-6 84 centimeters (33 inches) to accommodate a second seat. This resulted in the lower rear section of the fuselage arranging two stabilizers to prevent tail spins and caused the total number of stable tail fins of the Jianjiao-6 to be three.

Although the endurance is not sufficient, the addition of a second seat and the reduced fuel carrying capacity requires the addition of a fuel tank in another place to compensate for the insufficiency. However, the Jianjiao-6 and Jian-6 do not have any other basic differences. China had attempted to add two auxililiary fuel tanks on the wing tips but results proved that they were unable to be sustained by the 58 degree swept-back wings of the Jianjiao-6. The method for resolving this problem was the removal of the two huge 30 millimeter aviation guns on the wing roots and the use of this space to add the fuel tanks. Only one machine gun on the nose was kept for use in weapon training. After these modifications, the fuel carrying capacity of the Jianjiao-6 was only about 150 liters (33 gallons) less than that of the Jian-6 which is enough to sustain an average 45 minute class.

Like the Jian-6, the Jianjiao-6 is equipped with two Wopen-6 engines. The thrust of each engine is 2,600 kilograms and after afterburning it is 3,250 kilograms. Control is the same as that of the Jian-6. The highest speed is between 1.25 and 1.4 mach. The highest low altitude speed when not carrying additional

equipment is 1,340 kilometers (723 nautical miles). The gross weight is 8,742.5 kilograms (19,274 pounds) and with the two auxiliary fuel tanks totalling 760 liters (167 gallons), the thrust-weight ratio of the Jian-6 is 0.86:1. When at medium altitude, it has outstanding acceleration and mobility. The low altitude stable flight of the Jian-6 requires relatively precise control especially for the more inexperiences pilots. Therefore, a two-seater variant is required for the varying flight training of the transitional period.

In the past in Pakistan, the transitional flight training of the Jian-6 was carried out on the Jianjiao-2 and Jianjiao-5. After receiving the first Jianjiao-6 two years ago, the Pakistan Air Force improved its training course and used the Jianjiao-6 to equip two to three combat training troops. The student pilots must complete the course of taking off and landing with the Jianjiao-6 and only then can they pilot the Jian-6 aircraft alone. They must also complete a 66 hour class flight course on the Jian-6 before they can graduate.

Although the rear pilot's cabin is only slightly higher than the front cabin, yet its line of vision is better than that of the Jianjiao-5. Moreover, the cabin hood of the rear seat has its own windshield used for protection during emergency escapes. It is also equipped with two semi-automatic ejector seats. The Jian-6 of the Pakistan Air Force are equipped with British Matianbijia PKD 10 rocket driven ejector seats. Even when the altitude and speed are zero, they can be safely used. The British company hopes to refit this type of seat into Chinese aircraft yet due to cost problems this business has not yet been transacted.

When compared to the Jian-6 received earlier by Egypt and Pakistan, the Jianjiao-6 has many improvements which shows China's high standard of technology. Its originally mounted tires (tubeless tires) and disc brakes make deceleration control even easier yet it kept the manually controlled pneumatic brake system and front wheel independent brakes.

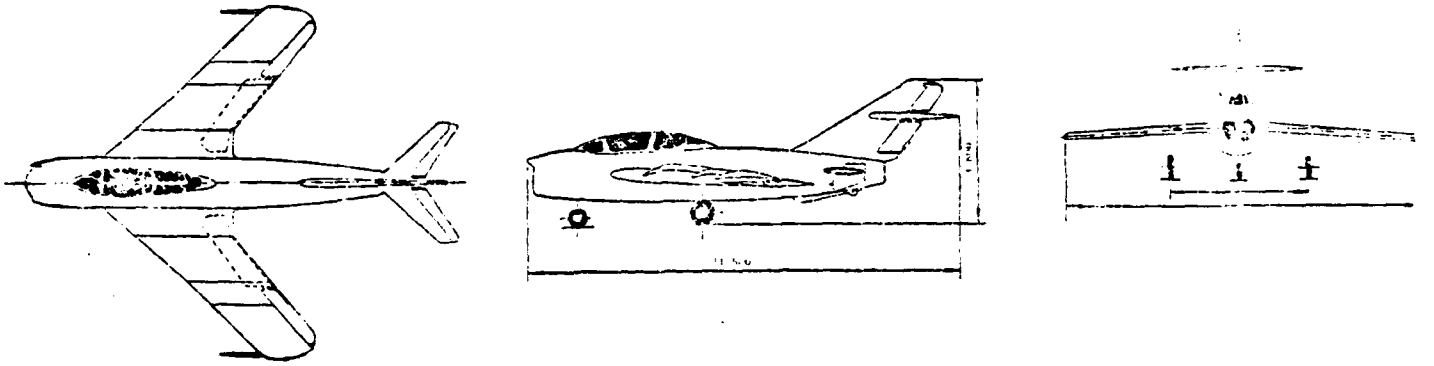

Fig. 51 Three views of the Jianjiao-5 training aircraft.

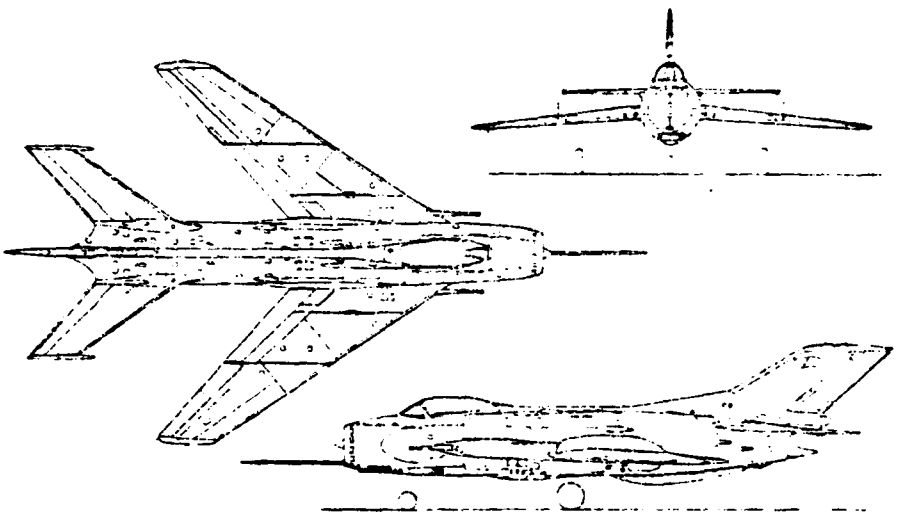

Fig. 52 Three views of the Jianjiao-6.

Another improvement of the later model of the Jianjiao-6 is that the position of the deceleration parachute is shifted from the lower part of the rear fuselage to below the tail rudder above the engine. Therefore, when landing, before the front wheels hit the ground the deceleration parachute can open and cause the landing speed to decrease to 350 kilometers (189 nautical miles).

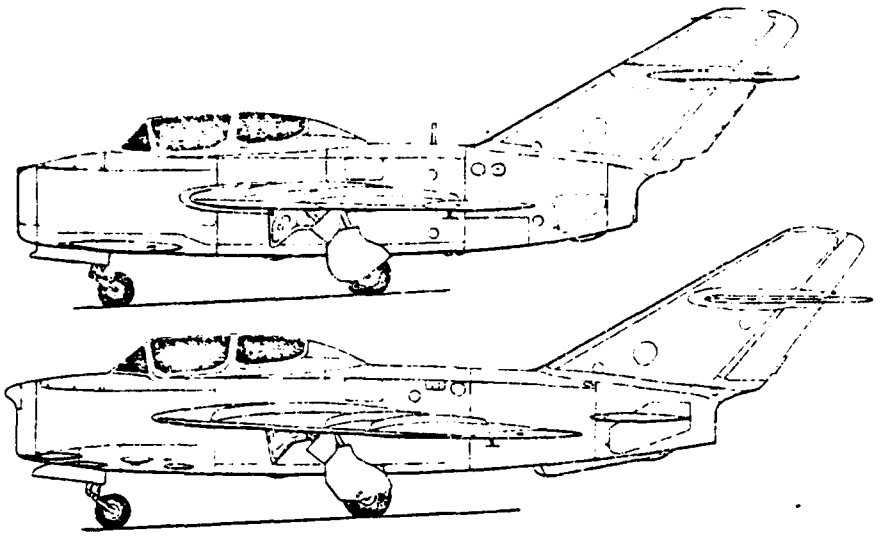

Fig. 53 The two-seater training aircraft Jianjiao-5 (below) developed by China based on the MiG-17 is compared to the MiG-15UTI (above).

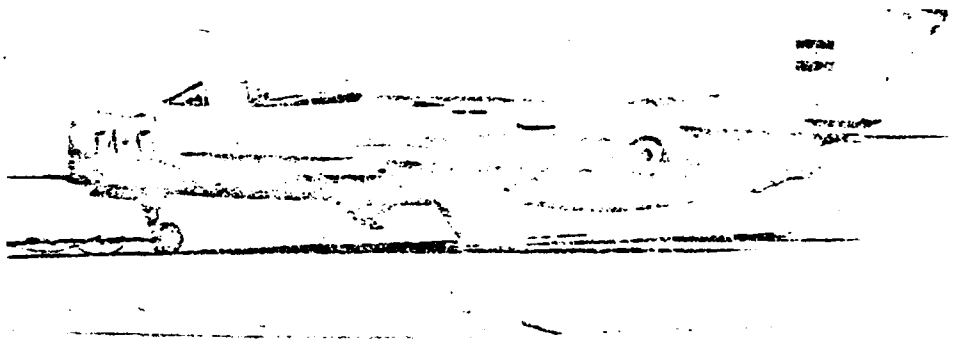

Fig. 54 The Jian-6 single-seater day fighter which was supplied to Egypt by China was developed from the MiG-19SF. The position of its brake parachute is different.

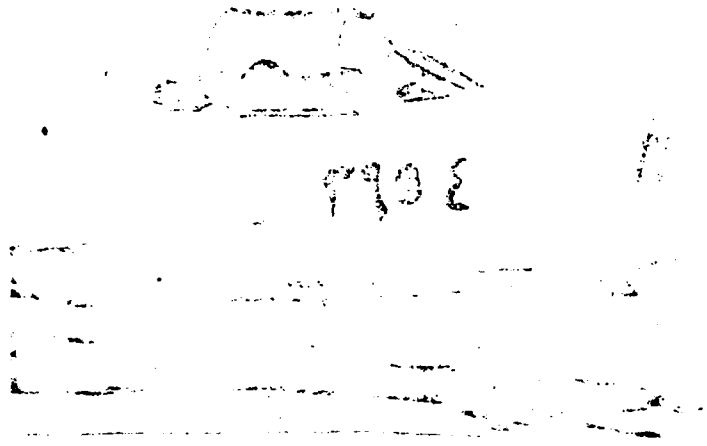

Fig. 55 Chinese-made front and rear seat training aircraft version of the MiG-19.

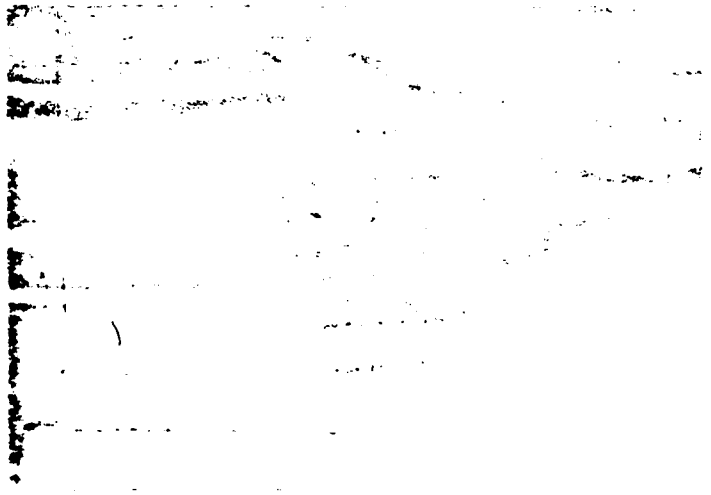

Fig. 56 Close-up view of the Jian-6 Xin with China developed radar in the nose.

Production of the Jian-6 and Jianjiao-6 is still continuing and each month about 60 are produced in Shenyang and Tianjin. It is worth pointing out that the latest produced Jian-6 variant is equipped with an improved Wopen-6A engine. The thrust

of this engine was raised from 3,250 kilograms to 3,750 kilograms. Because the engine's thrust was increased, the original engine air inlet could not be used. The Chinese then added twelve auxiliary intake valves on the side of the engine's air inlet (a similar design can be seen on the British Sparrow Hawk vertical takeoff and landing fighter) to meet requirements. Moreover, in the fairing of the air inlet there is arranged scouting rangefinding gunfire control radar. This variant has already been produced for many years and more than two years ago China issued a color diagram of this new variant. However, its auxiliary intake valve has not been given attention. It is believed that its various performances in the areas of speed, elevation, mobility, gunfire control and all-weather flight etc. have been improved similar to the Americans improving the F-5E into the F-5G. Aside from these, it is reported that the engine used for the Chinese Qiang-5 is also a variant of the Wopen-6A with thrust reaching 3,750 kilograms but the Wopen-6 engine used for the Jian-6 has thrust of 3,250 kilograms.

China's "Yun-11T" Multipurpose Aircraft

The design for China's Yun-11 (Y-11) aircraft was finalized in 1977 and small-scale production and tests use began. This is a multipurpose aircraft mainly used in agriculture and forestry. It can spray pesticides, apply fertilizer, carry out seeding, exterminate forest insects, aid in forest fire prevention, extinguish locust in plains, carry out geological explorations and survey for rare animals and natural resources. The performance of the aircraft, especially the operating stability at low altitudes, is very good. The line of vision is wide and its use is simple and convenient so that it can make a short distance landing on a simply-constructed runway. Its test use in China over the last few years has proven that the Yun-11 is a small multipurpose aircraft with excellent performance. Recently, there have been plans for this aircraft to add on heating equipment and fish eye windows so as to acccmmodate the winter enterprises and natural resource exploration.

In recent years in China, following the rapid advances in the economy, new demands have continually come forth for the small multipurpose aircraft. In the field of geological surveying, it is hoped that these aircraft can become aeronautical composite stations which simultaneously carry out surveying with many types of physical methods; add on high precision positioners so as to meet the needs of low altitude high ratio aeronautical surveying; aside from adapting to China's southeast low-flying regions, it must also be able to carry out aeronautical surveying of the high plain areas of the southwest and northwest. In the area of short distance transport, service departments hope that the Yun-11 can increase the quantity and range of business transport. The twin-engine turbo-propeller multipurpose Yun-11T is a large improved model based on the Yun-11.

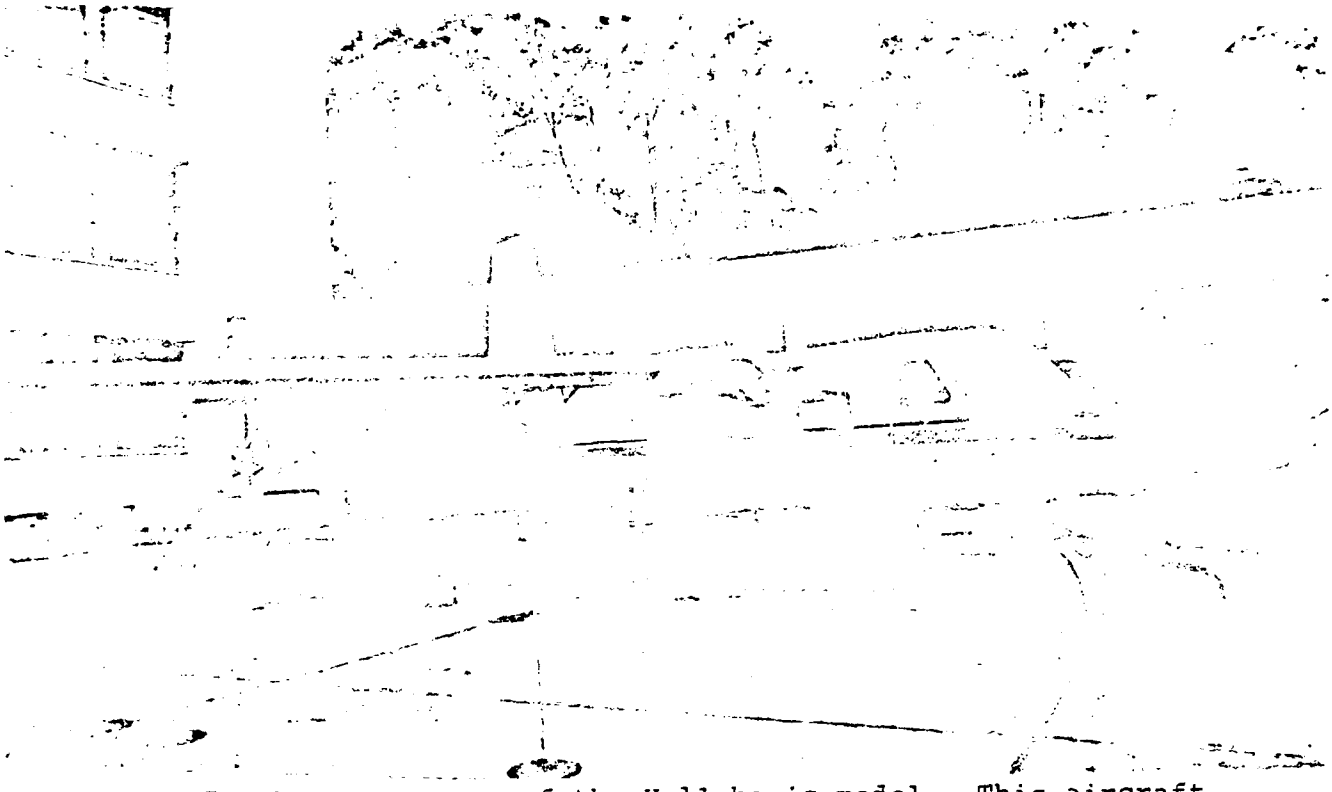

Fig. 57 The appearance of the Y-11 basic model. This aircraft was first displayed in the spring of 1979 at the Guangzhou Trade Fair.

The power equipment of the Yun-11T (Y-11T) changed to use two PT6A-10 turbo-propeller engines; it uses a high lift drag ratio new airfoil and whole fuel tanks, and adds on Doppler radar and other high precision navigation equipment. Further, corresponding improvements were made in other areas of the aircraft.

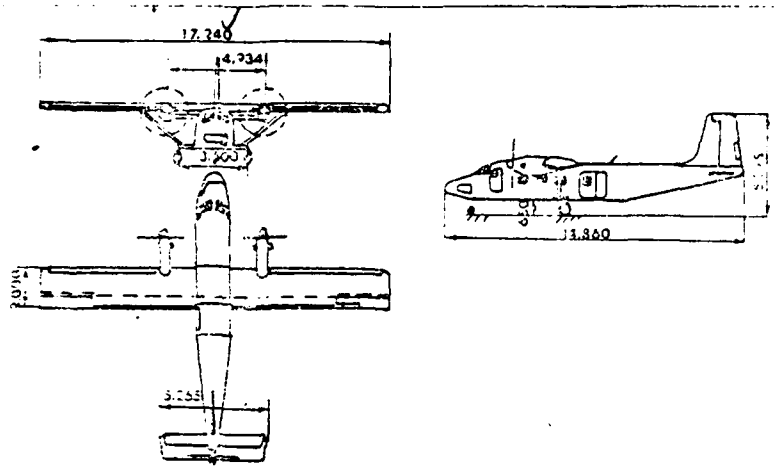

Fig. 58 Three views of the Y-11T aircraft.

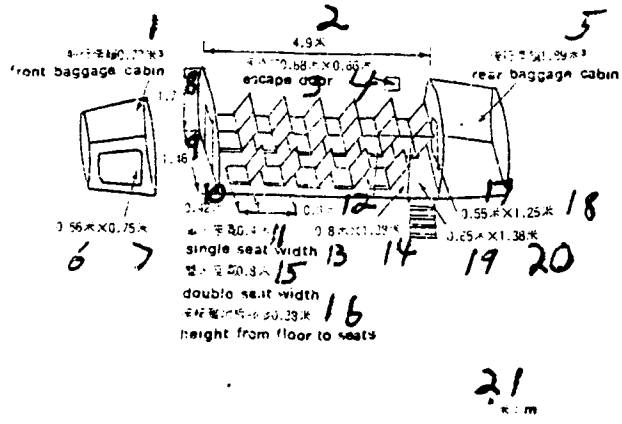

Fig. 59 The layout of the Y-11T's baggage and passenger cabins. Key: (1) - (21) Meters.

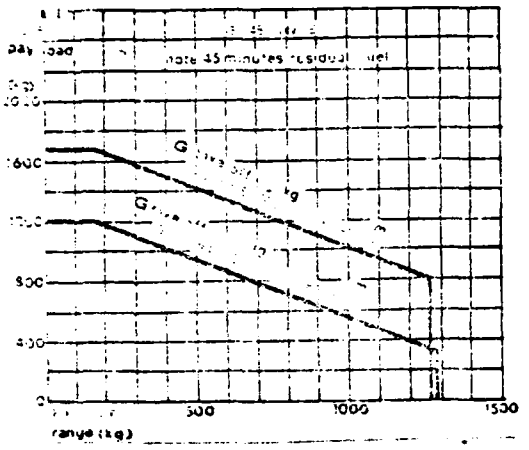

Fig. 60 Pay load range of the Y-11T.

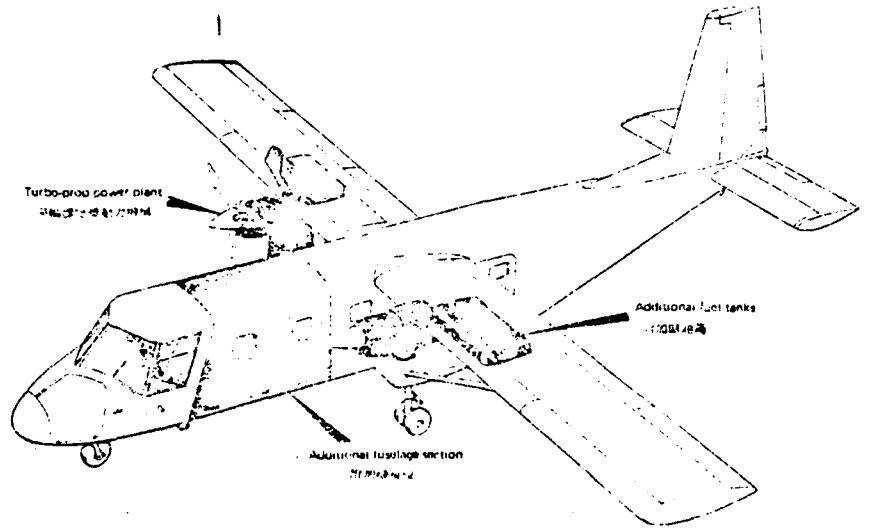

Fig. 61 The Australian Hawker Pacific Company proposed a design of the Yun-11 basic model and proposed to replace the two Chinese-built Piston-6A engines with a 400 horse-power Allison 250 B17B turbo-prop power plant.

In recent years, due to the drastic rise in the cost of fuel, there has been a tendency in international short distance transport to gradually replace jet passenger aircraft with medium and small turbo prop passenger aircraft. This has caused the so-called branch aircraft to rapidly develop. These aircraft are much more economical than the large passenger aircraft in

400-600 kilometer flights.

Aside from satisfying geological surveying and other multi-purpose requirements, at the same time the Yun-11T can also adapt to the needs of modern branch civil aircraft. The cabin is wide, the takeoff and landing distances are short, it can carry 17 passengers and completely meet the requirements of the American airworthiness FAR-23 regulations for passenger aircraft.

The Yun-11T can also implement the special operations of its predecessor the Yun-11 and be used in forestry. Because the volume of the Yun-11T's cargo cabin is enlarged, it is very suitable for spraying grass and tree seeds and for use in transforming grasslands or afforesting loess plateaus in China's northwest.

The major uses of the Yun-11T aircraft are: short distance passenger transport, geological survey, natural resources exploration, forestry and aerial delivery parachuting. Its major technical parameters can be seen in the following table:

Technical Parameters of the Yun-11T

Length : 14.86 meters
Height : 5.275 meters
Wingspan : 17.24 meters
Wing area: 34.27 meters^2
Passenger cabin (height x width x length): 1.7x1.6x4.9 meters^3
Cargo cabin door (width x height): 1.45x1.38 meters
Gross weight of aircraft: 5,000 kilograms
Weight of empty aircraft: 2,800 kilograms
Maximum fuel capacity : 1,200 kilograms
Maximum goods pay load : 1,700 kilograms
Climbing rate (H-O) : 6.3 meters/second
Maximum cruising speed : 282 kilometers/hour
Takeoff runway distance : 220 meters
Landing runway distance : 210 meters
Maximum flight range (45 minutes of fuel): 1,280 kilometers

The Yun-11T uses twin engines, an upper single wing, a single vertical tail and front three points fixed landing gear. It is equipped with two PT6A-10 turbo-prop engines, the limited power of a single engine is 475 horsepower, the diameter of the three-blade propeller is 2.36 meters and it has clockwise and counter-blockwise propeller equipment. The rectangular wings

have a double beam sway brace structure. The high lift drag ratio GA-0417 airfoil has a relative thickness of 17%. In order to improve the low speed and takeoff and landing performance, the leading edge of the wing has an automatic slotted wing, the inner side of the rear section has a draw back Fowler flap and the outer side has an aileron. The wing cover has a whole fuel tank structure and its maximum volume is 1,600 liters.

The fuselage has slightly arched rectangular sections on all four sides and when compared to a similar class aircraft, the inside of the cabin is wider. The height of the cabin is 1.7 meters, the maximum width is 1.6 meters, the length is 4.9 meters and the volume is 13 meters^3. In the front and rear of the fuselage are 0.77 meters^3 and 1.89 meters^3 baggage cabins which can hold 80 and 220 kilograms. Each side of the fuselage has four 0.61 meter thick windows. The left rear side of the cabin has 1.45 meter wide and 1.38 meter high large hatches which are convenient for loading and unloading large cargo or for aerial parachuting. There is a 0.68 meter x 0.66 meter emergency window opposite the cargo cabin. When used for parachuting, this window can be slightly enlarged and 14 parachutists can simultaneously jump out of the left and right sides.

When the Yun-11T is used for passenger transport, 17 seats can be arranged. When transporting cargo, the floor has 11 mooring rings to fasten the cargo. The bearing capacity of the floor is 750 kilograms/meter^2.

A large number of Yun-11T use cementing which has better performance than riviting or spot welding. The cementing agent used is "Zili-2" cement which has been used for many years. The cemented areas on the wing occupy over 70% and the whole full tank sections between the front and rear spars of the wing, the large spar belly plate's and the upper and lower edge strips are also cemented. About 40% of the truss and skin of the fuselage also use cementing and in the future its use will be expanded in mass production.

In the beginning of the 1970's, production factories used pure cementing on the non-major stress structural parts of

military aircraft and after many years of use the samples were brought back and shear destruction tests were carried out. Results showed that after ten years of natural ageing and use, the strength performance was basically unchanged.

The wing tank section between the sixth and seventeenth ribs of the front and rear spars on the left and right wings form whole fuel tanks. The total capacity is 1,600 liters. The two end rib system of numbers six and seventeen is formed from thick and hard aluminum plates machined on several control millers. The rear section of the plate on the fuel tanks has a large removable cover which is convenient for repairs and checks. The sealing of the upper and lower plates with the front and rear spars of the wing and end ribs used the milled groove and cement pouring method on the protruding edge of the moulding material. The upper end of the wing's steadying bar in the area of the tenth rib is next to a forged joint which passes through the lower plate and is connected to the tenth rib made from a milled whole plate and the fourth truss of the lower plate. This structure transmits the wing's flight load past the steadying bar to the winglet. When operating, the cement layer in the area of the steadying bar joint sustains the shearing stress as well as the pressure stress to ensure the sealing of the cemented slot.

The main parts of the Yun-11T all undergo full design tests before the prototype is test made, that is, the test part is manufactured according to the complete dimensions and proportions and performance and strength tests are carried out. The major parts are:

1. The whole fuel tank. Aside from carrying out kerosene sealing tests under full pressure conditions, we also carried out several static strength tests using a 100% design load under very strict conditions. After sustaining the maximum load, the sealing of each cemented joint of the test part kept well.

2. The GA-0417 new airfoil carried out flight tests on the Yun-11 one year ago. At present, more comprehensive performance tests are being carried out. Preliminary results showed that the flight quality was good. When the other conditions of the

aircraft were invariant, the new airfoil was able to increase the aircraft's maximum speed 3% and the climbing rate increased over 10%.

3. The retracting system of the swept-back flap is completed by the electrical mechanism passing the torsion bar and steel rope and the pulley and control flap moving on the slide-rail. This system also carries out full dimension simulated tests on the ground. Moreover, it also underwent long time flight tests on the Yun-11. The standard chain replaced the steel rope on the Y-11T. Before the prototype was test flown, comprehensive system simulation tests were also carried out on the ground so as to ensure operating reliability.

4. The structural stress modes of the wings and steadying bar are basically the same as those of the Yun-11. The Yun-11 has already accumulated over 2,200 flying hours, there have been nearly 20,000 hours of ground simulated fatigue life tests of the wings with steadying bars and a great deal of valuable data on the structural fatigue stress characteristics has been accumulated. After strenuous analysis, these experiences were applied to the structural design of the Yun-11T. The structural fatigue tests of the Yun-11T are being continued and in the future, fatigue life tests will be carried out on the Yun-11T's airframe based on new load spectrum.

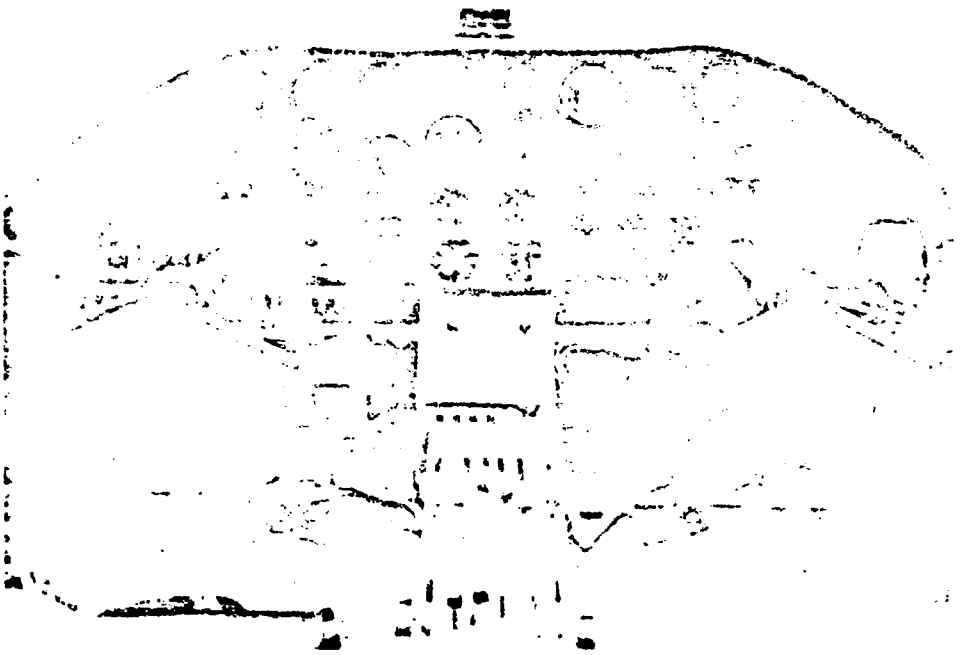

Fig. 62 The double entry control of the Yun-11 basic model multipurpose light bomber. The Chinese-made flight instruments shown in this photo also appear on the Yun-10 jet passenger transport aircraft recently test flown.

The first three Yun-11T have already been put into production. The first aircraft will be used for total aircraft static strength tests, the second and third aircraft will be used for flight tests. It is estimated that in the spring of 1982 strength tests and total assembly will be completed and test flights will begin before May.

At present, the Department of Geology has already ordered two Yun-11. These two aircraft will be equipped with geological survey equipment with aeroelectrical, aeromagnetic and aeronautical launching capabilities and navigation equipment which can ensure large proportion accurate measurements.

The variant designs of the passenger and air-drop models of the Yun-11T are planned to begin in 1982 and it is hoped that by the beginning of 1983 demonstration flights will be carried out

throughout China.

(Reference Room of this Journal)
(Based on the International Aviation monthly, No. 1 (1982))

The Successful Development of China's Yun-7 Medium Short Range Transport

The Yun-7 (Y-7) is a medium short range twin-engine turbo-prop transport which was made to meet the needs of China's branch line transportation. Its passenger capacity is 48-52 people. Based on requirements, it can be refitted into a cargo transport or passenger and cargo combined model and it can also be used to carry out natural resources exploration, mapping, airdrops, first-aid and various other tasks.

The Yun-7 aircraft has two WJ5A-1 turbo-prop engines and the power of each engine at takeoff is 2,900 equivalent horsepower. Under high plateau and high temperature conditions, it still has sufficient takeoff power.

To date, the Yun-7 has accumulated more than 1,600 flying hours and more than 3,600 takeoffs. At the beginning of April, 19.2 ton and 21 ton single-engine continuous takeoff test flights and 21 ton single-engine non-continuous takeoff test flights were carried out at Tianjin's civil aviation airfield.

The fuselage of the Yun-7 has a semimonocoque structure and the shape of the transverse section is two arches with different diameters divided into front, middle and rear sections. The front and middle sections are the air tight cabin.

The wing is made up of a square-cut center wing, a trapezoidal middle outer wing and an outer ring. The wing section is a lenticular laminar flow airfoil. The wings have geometric torsion and aerodynamic torsion to improve stall characteristics. The center wing tank is equipped with a soft fuel tank and the lower section has a connecting joint with the engine and main landing gear. The trailing edge of the center wing is equipped with a single slotted aileron, the middle outer wing is equipped with a double slotted aileron, the outer wing is equipped with a two section aileron and the leading edge of the wing has a hot air heating de-icer.

The cantilever tail is a completely metallic structure, the tailplane has a dihedral angle and when in flight the influence of the disturbance airflow on the wing is relatively small.

However, it is still located in the good slip flow of the propeller. The large area dorsal fin and double ventral fin increased the transverse side stability of the aircraft.

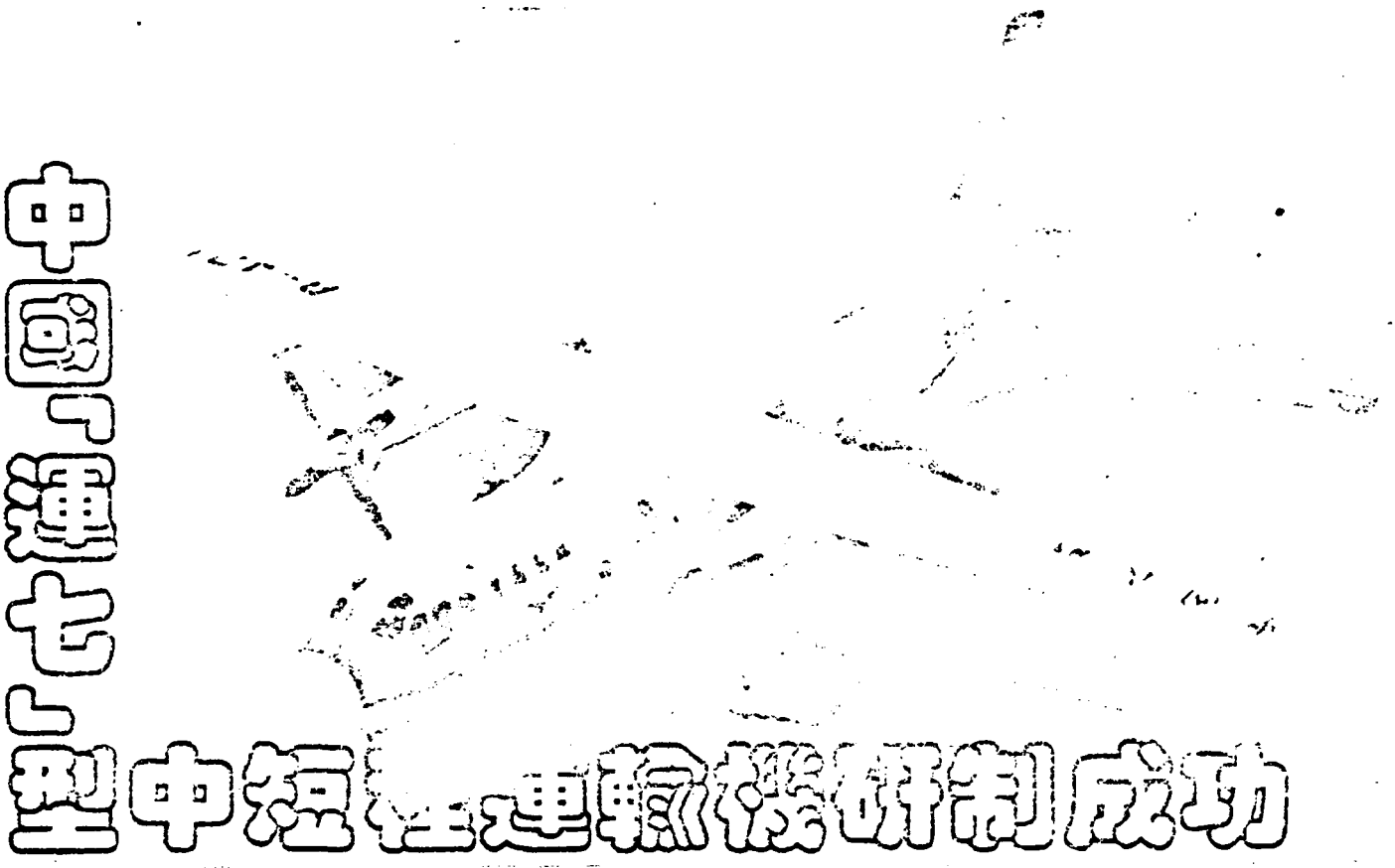

Fig. 63 The appearance of the Yun-7 transport.

The landing gear is hydrautically retracted, is a front three points model and uses double wheels. The direction of the front wheel can be controlled and the main wheel has disc brakes. When the landing gear is retracted, this can guarantee emergency release under the effects of head-on air currents and dead weight. The main landing gear has low pressure tires so that the aircraft can safely takeoff and land on a dirt runway.

The turbo-blade of the WJ5A-1 turbo-engine uses the advanced hollow air cooling technique which causes the temperature in front of the engine's turbine to rise. This increases the power

of the engine. It also has a converter with two types (I and II) of rotational speed. When taking off using speed II, the power can reach 2,900 equivalent horsepower. The engine is mounted relatively high on the aircraft and can avoid the entrance of sand and stones. The four bladed J16-G10A propeller can automatically change distance, automatically feather and the blade is sufficiently high off the ground. Further, there is also a turbine engine so that the aircraft can independently start when there is no ground power source.

The left and right independent fuel systems can separately supply fuel to the left and right engines. An engaging switch is installed between the two systems. There can be 4 or 8 soft fuel tanks in the center wing depending on order requirements.

The hydraulic system is made up of a main system and emergency system. The main system is used to control the flaps, landing gear retraction, direction of the front wheel, wheel brakes, propeller's emergency feathering and the engine's emergency brakes etc. The emergency hydraulic system is directly used for the main wheel's emergency brakes and emergency retraction of the flaps.

The operation of the elevator, rudder and aileron is hard, the elevator's adjusting plate is controlled by steel rope and the rudder and aileron's adjusting plate are motor operated. The automatic pilot and control system are joined so that pilots can use the automatic pilot to operate the aircraft according to need.

The high altitude system has two parts: the air temperature and pressure automatic regulation. It is used to guarantee suitable temperature, pressure and fresh air in the cabin. The cabin air is pressurized air brought in from the engine's tenth compressor. It can guarantee 20-26 exchanges of air per hour in the cabin. The cabin is also equipped with two movable oxygen devices which are used by the flight crew and passengers under emergency conditions.

The de-icing system uses the two methods of hot air and electric heating. The wings, tail, air intake duct leading edge

of the engine and air intake guide's blade use the hot air heating supplied by the engine's compressor, and the propeller, windshield etc. use electric heating for de-icing.

The power source system includes 27 volt direct current, 115 volt 400 hertz single phase alternating current and 36 volt 400 hertz three phase alternating current. The main direct current source is two starting engines and the emergency power source is two accumulators; the main alternating current source is two motors and one single phase converter. There are four three phase converters in the three phase alternating current source system.

The navigation instruments are: the gyro half compass, gyro induction compass, magnetic compass, altazimuth, automatic pilot, altimeter, speedometer, elevating speedometer, turn indicator, dive angle indicator, clock etc.; the radio navigation devices are: navigational radar, radio compass, radio altimeter, beacon receiver etc.; the communication devices are: short wave transceiver, ultra-short wave transceiver, aircraft intercom etc.

In order to lighten the structural load and raise the aircraft's fatigue performance, the greater part of the structure of the Yun-7 aircraft uses whole components such as whole large spar of the wings, whole wall plates, whole wing r .. as well as engine and wing connections, the whole joints of fuselage and wing connections etc., and the connections of the fuselage skin and truss use the new technique of gluing and spot welding.

During the manufacturing process, power measurements of the entire aircraft and parts, tests to measure the pressure of the wind tunnel, static tests, landing gear landing vibration tests, systems tests and reliability tests of the aircraft's equipment etc. are carried out. Entire aircraft fatigue tests are being carried out and at present there have already been 48,000 flying hours of fuselage fatigue tests. Plans are for 120,000 hours of tests.

After tests and test flights, the Yun-7 aircraft airframe has been given the first overhaul period life of five years or

5,000 flying hours.

The major technical data of the Yun-7 medium short range transport is:

Length : 23,708 meters

Width : 2.9 meters

Wingspan : 29.25 meters

Height : 8.56 meters

Main landing gear clearance: 7.9 meters

Forward landing gear clearanc-: 7.9 meters

Wing area: 75 meters

Maximum takeoff weight: 21,000-22,000 kilograms

Maximum landing weight: 21,000-22,000 kilograms

Empty weight: 14,235 kilograms

Maximum fuel capacity: 4,000 kilograms (without auxiliary fuel tank), 4,800 kilograms (with auxiliary fuel tank)

Maximum commercial load: 4,700 kilograms

The maximum fuel carrying range of the aircraft is 1,900 kilometers; when carrying 48 passengers with 45 minutes of residual fuel and the takeoff weight is 21 tons, the range can reach 1,000 kilometers.

Because the takeoff power of the engine is relatively large, the sea level climbing rate can reach 8.5 meters/second. When the takeoff weight is 21 tons and the twin engines have rated power, the operating ceiling is 8,850 meters. When the takeoff weight is 21 tons and the engines have 0.85 rated power, the cruising speed is 480 kilometers/hour. Based on related standard requirements, in a sea level 40°C high temperature airfield and a 2,000 meter above sea level 20°C air temperature high plateau airfield, after the aircraft takes off and is at a safe altitude, when one engine shuts down and the climbing gradient of the second stage of takeoff is maintained at 2.5%, the maximum takeoff weight limit is 21.8 tons. Under standard atmospheric conditions, when the takeoff weight is 21 tons, the takeoff runway distance is 580 meters and the landing runway distance

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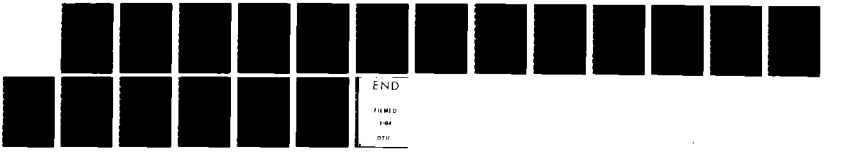

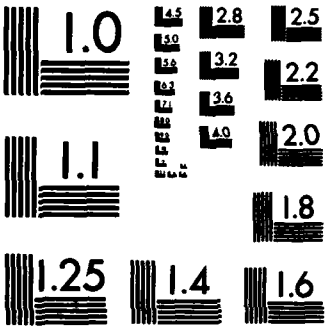

575 meters. When the takeoff weight is 20 tons, the single engine ceiling can reach 3,400 meters.

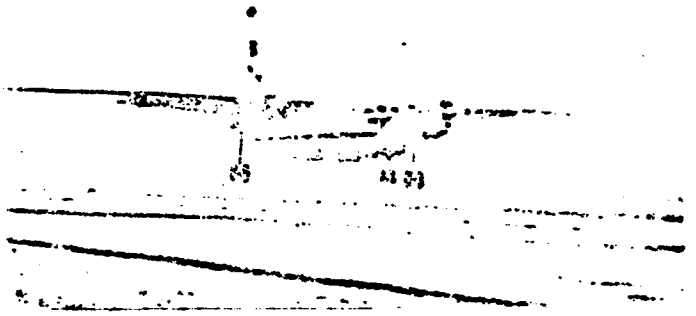

Fig. 64 The Yun-7 passenger aircraft carried out single-engine flight tests and the engine on the right side of the photo has already stopped.

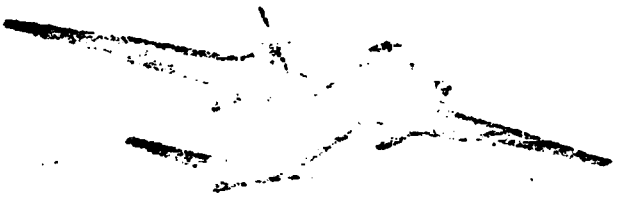

Fig. 65 The Yun-7 passenger aircraft climbs with one engine on.

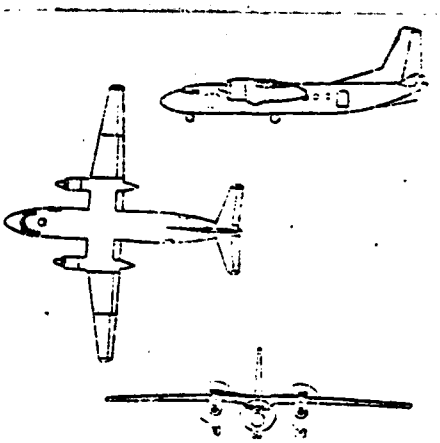

Fig. 66 Three views of the Yun-7.

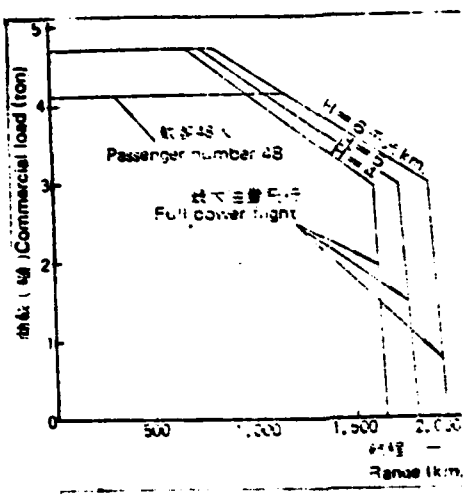

Fig. 67 Commercial load range of the Yun-7.

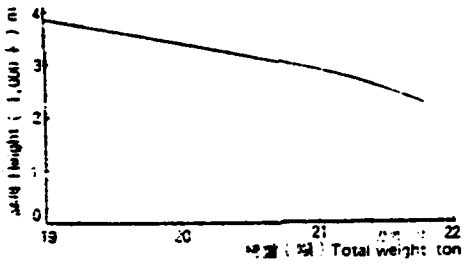

Fig. 68 Single engine ceiling of the Yun-7.

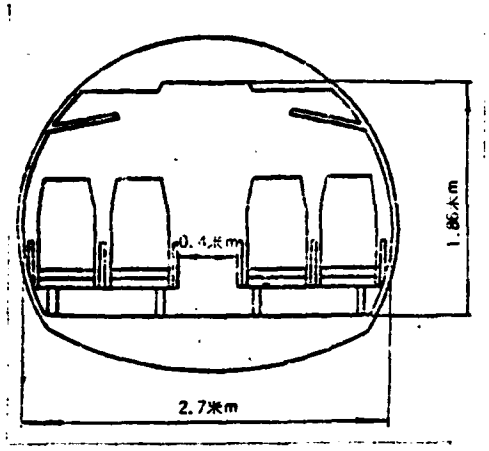

Fig. 69 Passenger cabin arrangement of the Yun-7's basic type.

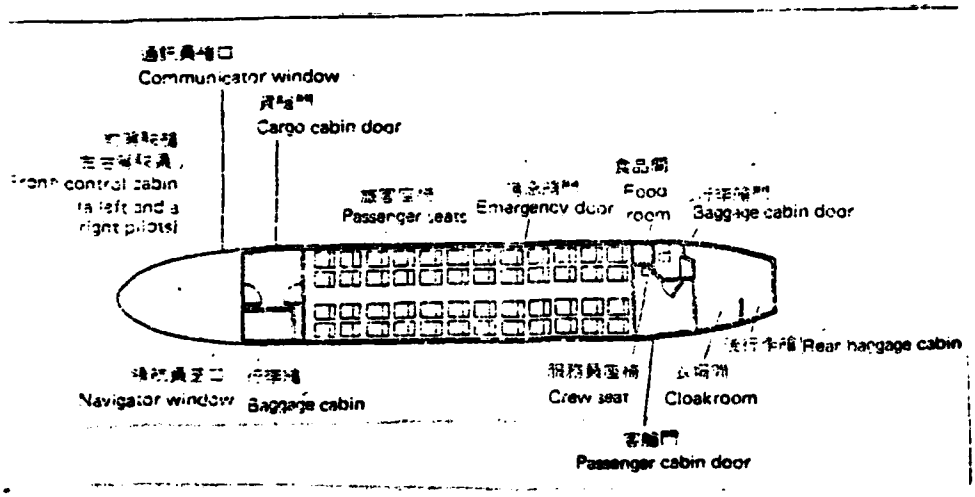

Fig. 70 Interior arrangement plan of the Yun-7.

Single-Engine Flight of the Yun-7 Transport

On a clear morning on April 4, 1982, the Yun-7 medium short range branch line transport carried out single-engine continuous flight tests at the Zhang Guizhuang Civil Airfield in Tianjin.

When the twin-engine civil aircraft takes off, if one engine breaks down and the aircraft stops the pilot must be able to operate the aircraft and so single-engine continuous takeoff or single engine interrupted takeoff is used to guarantee the absolute safety of the passengers. Therefore, this single-engine test flight was the most crucial test flight for the Yun-7.

At six o'clock, the commander issued the takeoff orders. The takeoff weight was 19.2 tons. The Yun-7 quickly raced up the runway with the speed continuously increasing.

In an instant, the aircraft had reached the critical speed. When the aircraft was 2.5 meters off the ground, the right engine (crucial engine) was closed down, the blades nimbly went along, slowly rotated and finally stopped. The left engine still made a roaring sound as if singing heartily. The aircraft veered slightly downwards, continued to maintain a correct course, steadily climbed and the landing gear quickly retracted. It climbed to about 400 meters and after completing its up and down course above the airfield, the Yun-7 slowly descended towards the airfield with one engine. The operating movements of the pilot were accurate and steady and it was a clean landing. The measured data was better than predicted and this single-engine continuous takeoff test flight was completely successful.

After a brief rest, at 7:30, the second test flight was carried out and the takeoff weight was increased to 21 tons. For medium small scale aircraft, the increase of 1,800 kilograms must be considered as serious.

On April 7, the Yun-7 carried out single-engine interrupted test flights. Under maximum takeoff weight, the aircraft smoothly accomplished runway acceleration, the front wheel lifted off, the right engine shut down (crucial engine) and the automatic feathering and other movements used normal braking for

touchdown. The test flight achievements were quite outstanding and the lateral displacement was only 4 meters.

This test flight of the Yun-7 was completely successful.

Single-engine stopping caused the symmetry of the force on the aircraft to be destroyed and under the effects of the pulling force and moment of force of the operating engine and the drag and moment of force of the stopped engine, the aircraft could produce drastic deflection and inclination. Further, because the aerodynamic characteristics of the aircraft were destroyed, the lift coefficient decreased, the drag coefficient increased and the l ft-drag ratio correspondingly decreased. This caused the operation of the aircraft to become complex and there were even higher demands on the reliability, structural strength and performance indices of the aircraft system. Therefore, this single-engine test flight was a rigorous examination of each aspect of the aircraft. The success of this test flight provided reliable data for the finalization of the aircraft's design.

(Originally carried in "International Aviation," No. 7 (1982), slightly abridged).

China's Qiang-5 Attack Aircraft

In January, 1958, 24 years ago, when the Soviet Union was still the faithful advisor of China's newly built aviation industry and the ideological split between China and the Soviet Union was beginning to surface, the Soviet Union gave a license to China to produce the supersonic MiG-19. Although later the Soviet experts left and the technicians of China's aviation industry were inexperienced and not fully trained, China still continued plans for the production of the MiG-19. Production was carried out first in Shenyang and later in Tianjin as well. Although there was no expert assistance, in the middle of 1964, China's aircraft industry was able to deliver several hundred MiG-19 aircraft to the Chinese Air Force troops and the Chinese called it the Jian-6 fighter.

After many years, they gained valuable experience and the quality of the produced airframe and Tumansky RD-9B jet engine was greatly raised. The latter manufactured in Shenyang was called the Wopen-6 - the overhaul period was double that of the original design reaching 200 hours. They were installed on the day Jian-6C and limited all-weather Jian-6A and Jian-6B. The latter are equivalent to the MiG-19PF and PM. Aside from these, China also developed a two-seater training aircraft completely different from the Soviet-built MiG-19UTI which is the Jianjiao-6. During the 1960's and 1970's, China developed a series of Jian-6 variants and at the same time the Chinese Air Force felt the need to obtain a better performance ground attack aircraft. This was because when China used the Jian-5 (MiG-17) aircraft as an attack aircraft (because the low altitude performance of the Jian-5 was relatively good), they felt that by today's standards, the payload and range of the Jian-5 was extremely poor. Thus, China used the Jian-6 with reliable performance as the basis for development.

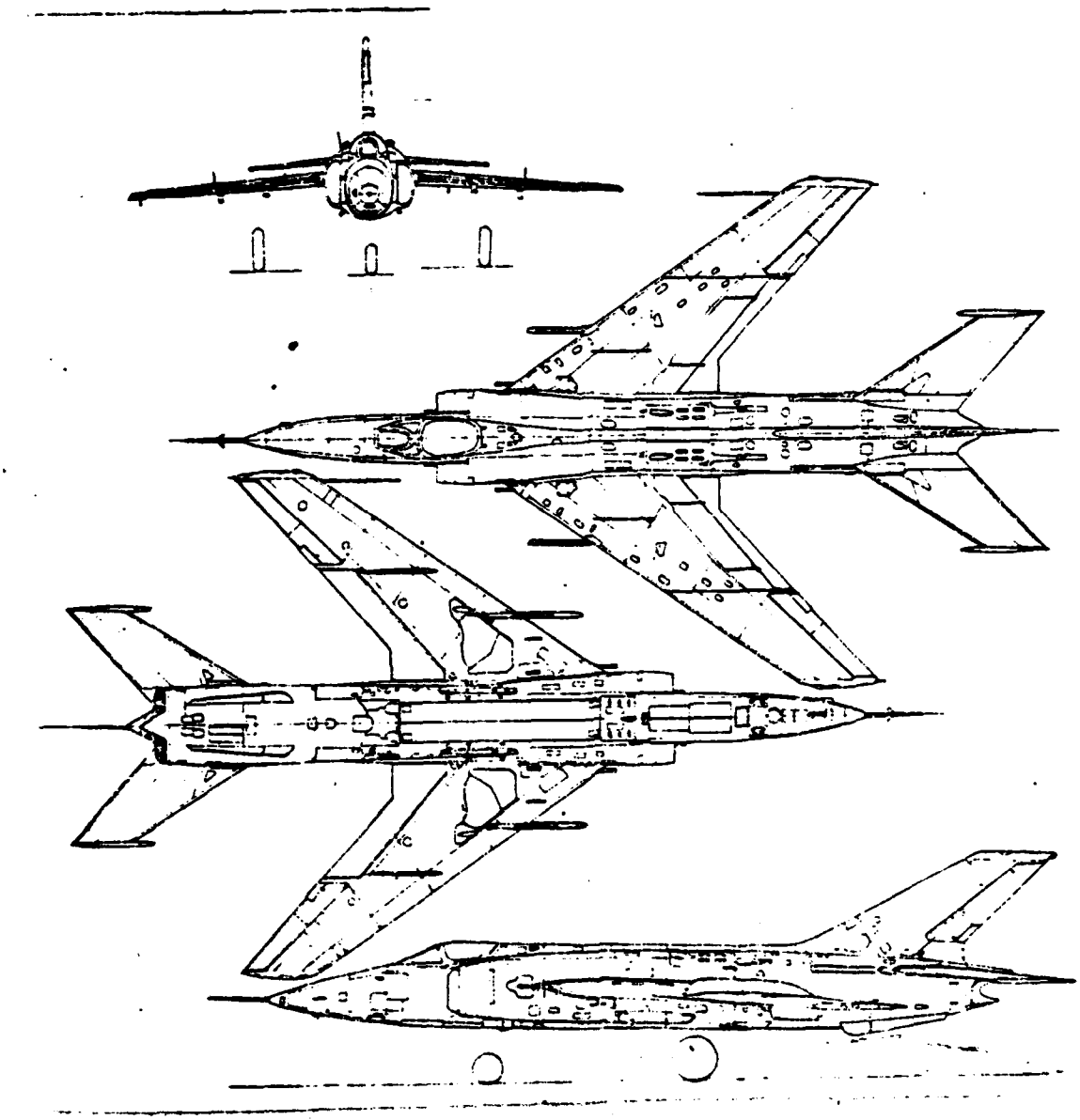

Fig. 71 The Qiang-5 attack aircraft.

The Chinese Air Force obviously needed a variant which had high speed low altitude breakthrough capabilities and could carry limited payloads (for example, four 250 kilogram bombs) or another attached weapon system (for example, the cluster-type rocket launching tube) as well as simultaneously have excellent low altitude low speed performance. When designing the MiG-19, the Mikoyan selected a simple nose forward position air inlet

so that it could attain a speed of 1.3 mach. This was perhaps because the Mikoyan lacked the experience to design a lateral air inlet. They ignored the fact that this was a twin-engine aircraft and its engines were well placed in the rear section of the fuselage. Usually, the designs of the nose's forward position air inlets were made to suit the fighter variants with middle position engines. Therefore, the design of the lateral air inlets was worth recommending to be installed on the fuselage of the original Jian-6 aircraft.

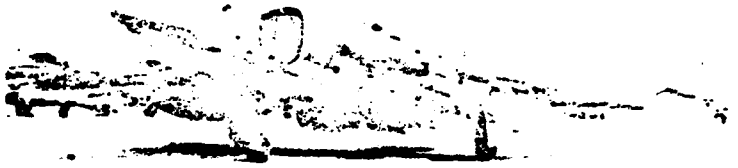

Fig. 72 The Qiang-5 attack aircraft of China.

Fig. 73 The Qiang-5 attack aircraft of China.

The design of the lateral air inlets can be found in many precedents yet the related variants are all aircraft with middle position engines. This type of design allows them to be able to

install radar survey systems in the space. The situation of the Jian-6 is completely different. The two Wopen-6 engines are quite small and only use a very small amount of the fuselage depth and are well installed in the rear section of the fuselage. This installation of an interior weapons bay provides advantageous conditions and meets the partial needs of the Chinese Air Force. Only if the lateral air inlets are installed can each type of instrument such as the radio, battery, air regulating system and radar be placed on the nose.

The lateral air inlet was finally used, not only to fit the design of the twin-engines but also to keep the major part of the MiG-19's original design so that the positions of the wings, wheels and machine guns could be maintained unchanged and greatly reduce the difficulty of redesign and save on design time. The new pointed conical nose was fitted on the fuselage of the original Jian-6 and the two sides have two lateral air inlets. Its rear fuselage is narrowed to suit high speed flight and there are also two separating plates in front of the air inlets.

The position of the front wheel is shifted back a little so as to make space in the nose for more equipment and the position of the pilot's cabin is shifted forward so as to obtain a better field of vision. The rudder is redesigned so as to reduce the air drag and heightened so as to supplement the changed design and lost steering stability. In order to prevent the airframe from being extended back and causing tailspins, the stabilizing fin of the original Jian-6 is removed and replaced with two huge stabilizing plates placed on the two sides under the tail. A secondary change was the cockpit hood being changed from the rear sliding type to the lift up type.

As regards the wings, a main fairing and three auxiliary fairing are kept unchanged. The 30 millimeter machine gun in the front section of the wing root is also kept. Only the elevating plate is slightly modified so as to slightly increase the wing area and during low altitude flights it can prevent the occurrence of vortex flows behind the wind root and avoid influencing the stability of low altitude flights.

The above gave the differences and similarities of the Jian-6 and Qiang-5. The West views it as a fighter similar to the British Buccaneer which can carry four 250 kilogram bombs and which can be used for low altitude low speed breakthroughs. When the West first discovered this attack aircraft in the commercial market, Chinese officials said that the design of this type of aircraft already had a ten year history. For this reason, we can assess that this type of attack aircraft was test flown in the latter part of the 1970's and was first produced in 1972 or 1973 in Nanchang. Although present production is not known, Nanchang's aircraft manufacturing capabilities need not be doubted.

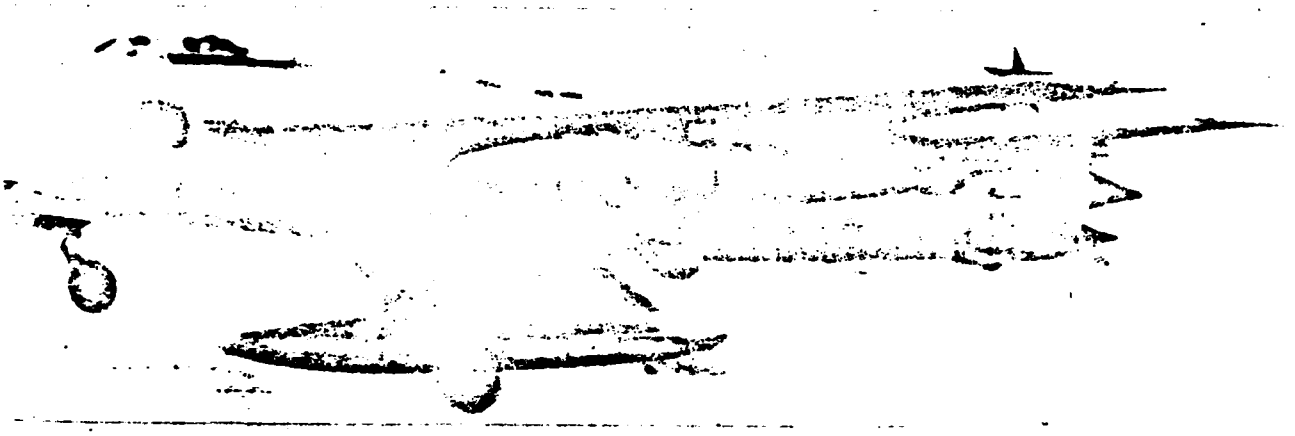

Fig. 74 The Soviet-built MiG-19F attack aircraft.

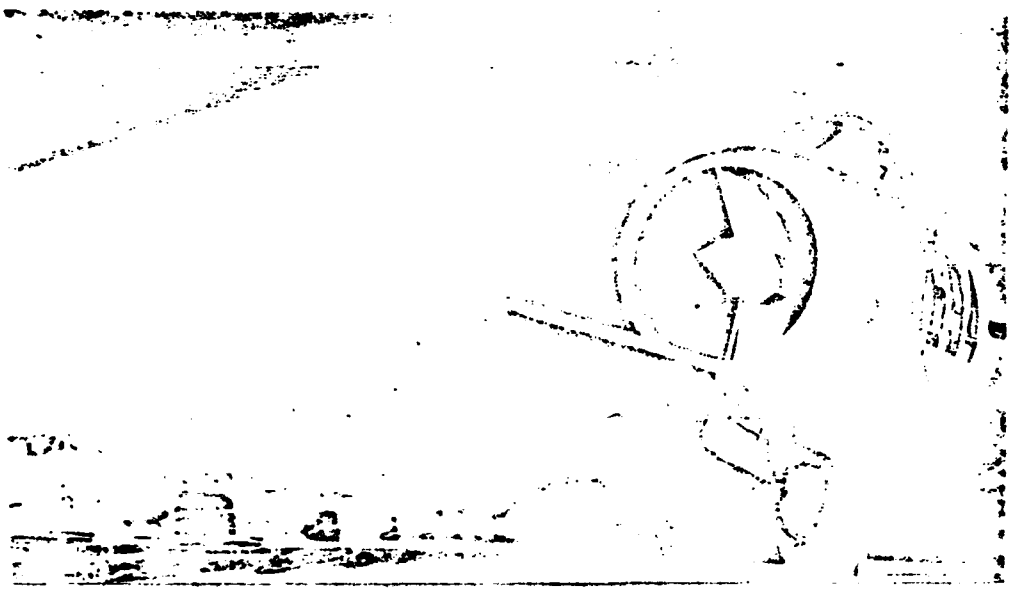

Fig. 75 The Jian-6 attack aircraft.

At present, there is no proof for statements by Western analysts that the Qiang-5's wing area is 30% larger than that of the Jian-6 and its weight was increased 44%. However, more believable is that the Qiang-5 is 135 to 180 kilograms heavier than the Jian-6 and its fuel capacity has been increased 15 to 20%. When the interior bomb bay is full and it is carrying two 760 liter auxiliary fuel tanks, the combat radius of the Qiang-5 is: when low-low-low it is 370 kilometers, when high-low-high it is 650 kilometers and moreover it maintains the capability of full speed heating escape. One-way flights are about 1,850 kilometers and the ascending limit is 15,500 meters.

The Wopen-6A modified engine used by the Qiang-5 increased the thrust from the 2,600 kilograms net thrust and 3,250 kilograms heating thrust of the Wopen-6 to a net thrust of 3,000 kilograms and a heating thrust of 3,750 kilograms. Moreover, the overhaul period was greatly lengthened. The highest speed of the Qiang-5 is about 1.2 to 1.35 mach and at 10,000 meters the highest level speed is 0.95 mach. Its climbing capability is 20,000 feet per minute. It is believed that the Qiang-5 has high speed low

altitude breakthrough capabilities yet requires the giving up of the pylons and the launch pylon measures are very expensive.

Aside from the interior bomb bay, below the wings there are also two weapon racks. Each rack can carry one 250 kilogram bomb. There are also four wing racks which are used to carry auxiliary fuel tanks, air-to-air missiles, eight 57 millimeter cluster-type rocket launchers and bombs etc. The other interior equipment is estimated to be navigational and range-only radar, radar altimeters, enemy and self discriminators, aerial artillery cameras, Chinese ARK-5 receiver compasses, RSIU-4VHF communication transmitters and MRP-48P communication receivers etc.

In other words, this Nanchang built Qiang-5 (called the Fantan in the West) attack aircraft can be regarded as an inadequate product of the transition period by Western standards. Although its continuous navigation range and payload are better than those of the Jian-5, Jian-6 and Jian-7, yet when compared to Western aircraft such as Jaguar ground attack aircraft, then there is still some distance between them and improvements are required.

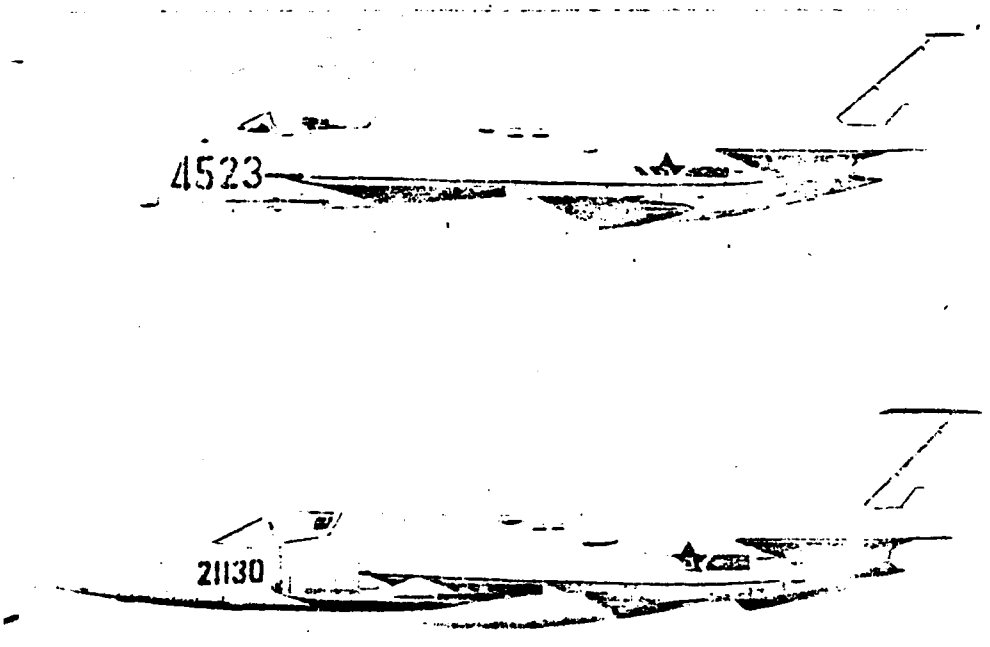

Fig. 76 Schematic drawing shows the differences between the Jian-6 (above) and Qiang-5 (below).

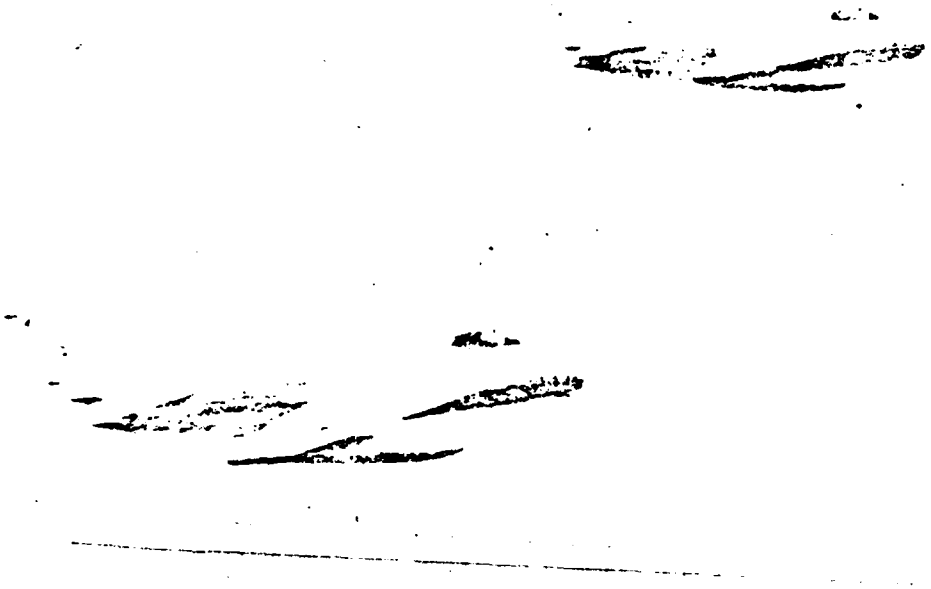

Fig. 77 Jian-6 attack aircraft in flight.

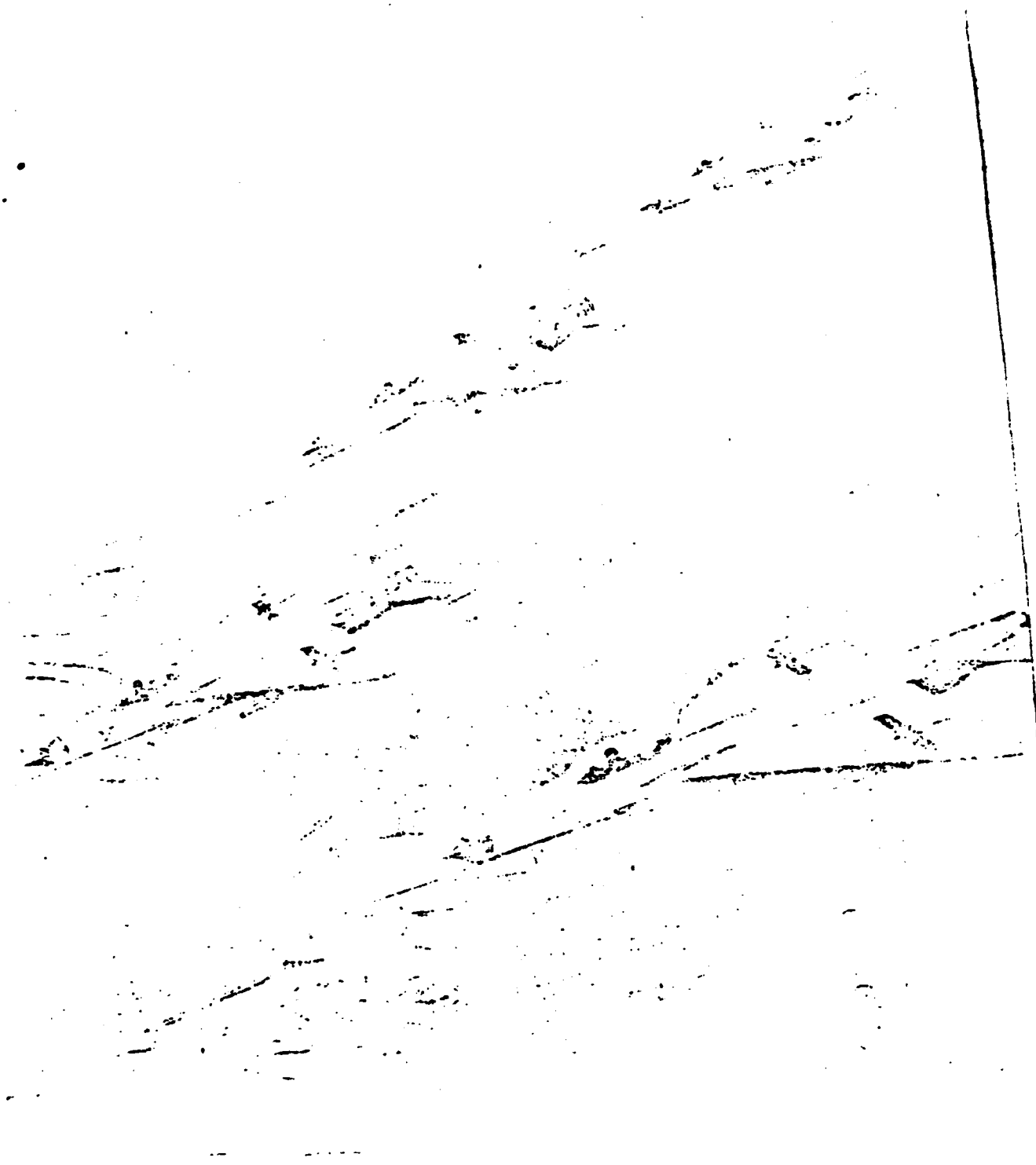

Fig. 78 The Chinese Air Force's MiG-21F "Fishbed-C" fighter.

The Chinese Airforce's Jian-7 Fighters

At the beginning of the 1960's, there was deterioration in relations between China and the Soviet Union. When the Soviet experts left, China relied on itself and successfully developed the MiG-19S fighter and set about copying the MiG-21F fighter. The latter was successfully made at the end of the 1960's. It was called the Jian-7 and used to equip the PLA troops up to the 1970's. Chinese technicians continually made improvements on the Jian-7 and even though the original design had limitations and was unable to be thoroughly remolded, yet there were still very large improvements in industrial performance as compared to the original Soviet model.

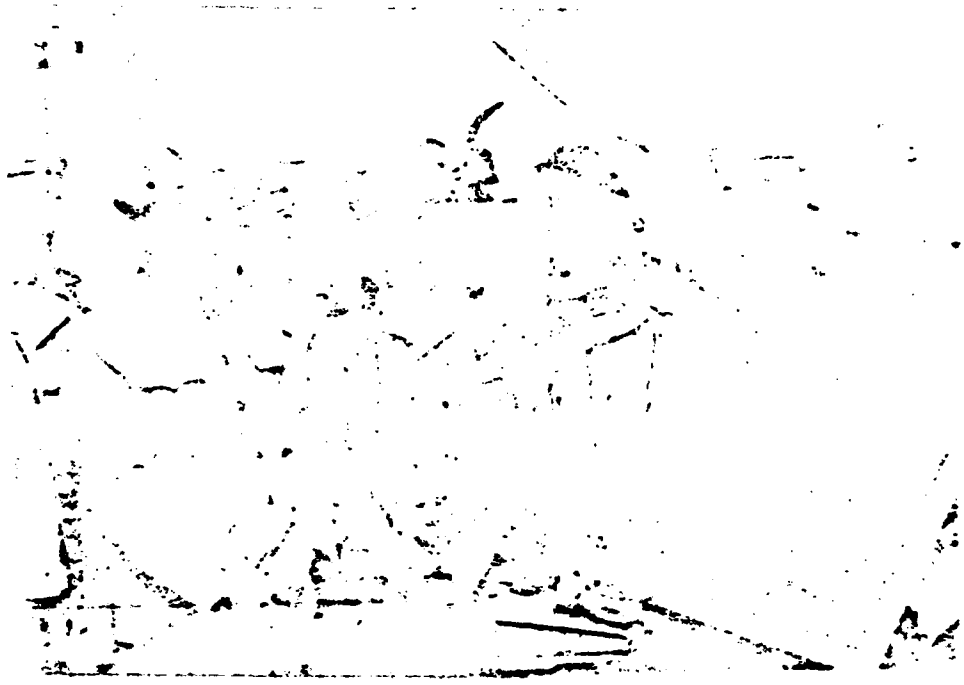

Fig. 79 A PLA Air Force Jian-7 pilot and Air Force Commander Wang Hai of the Guangzhou studying tactics together.

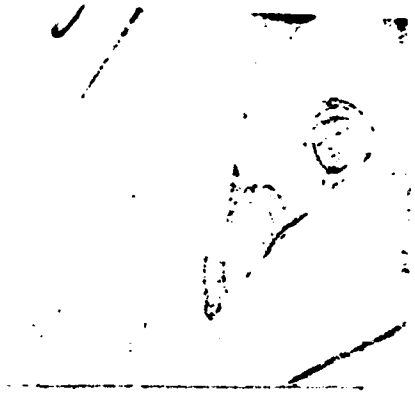

Fig. 80 Close-up of port air-to-air missile of the Jian-7 fighter.

Fig. 81 Jian-7 fighter squadron. In the photo, we can see the AA-2 "Atoll" air-to-air missiles under the two wings and two 30 millimeter machine guns under the front section of the fuselage.

Fig. 82 Air Force Commander Wang Hai of the Guangzhou troops checking the flying techniques of pilots.

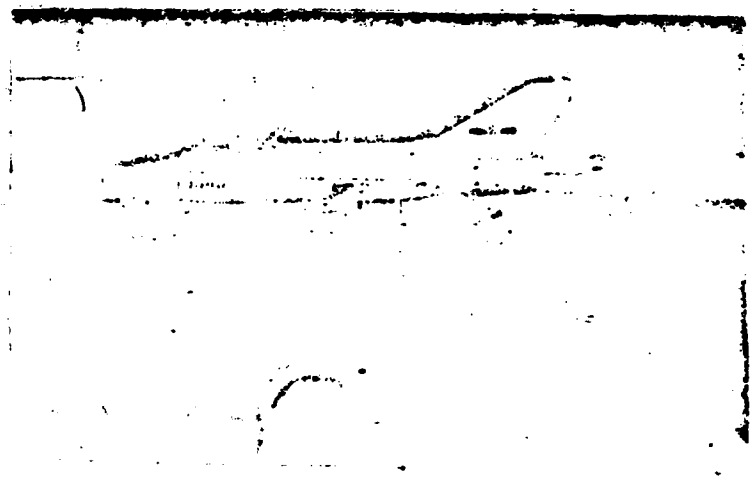

Fig. 83 A Jian-7 fighter in night training.

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